IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication OCTOBER 6, 1960

★ Special Metal Show Feature:

How to Get More From Hi-Strength Steels p. 167

Sen. Jackson on Business Issues p. 141

Don't Oversell Your Products p. 131

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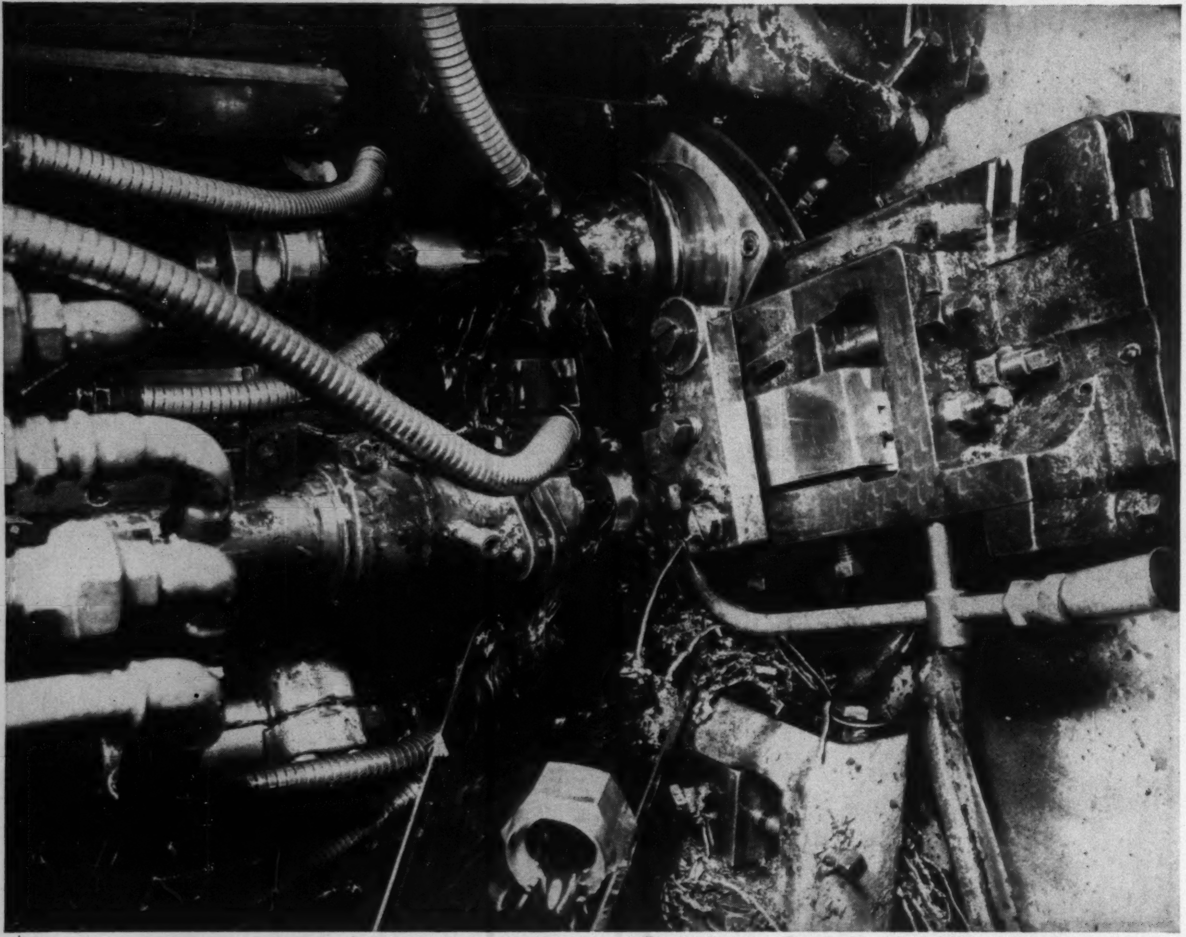

Photo courtesy Elastic Stop Nut Corporation of America

Nuts . . . ESNA makes millions of them from Aristoloy Electric Furnace Steel

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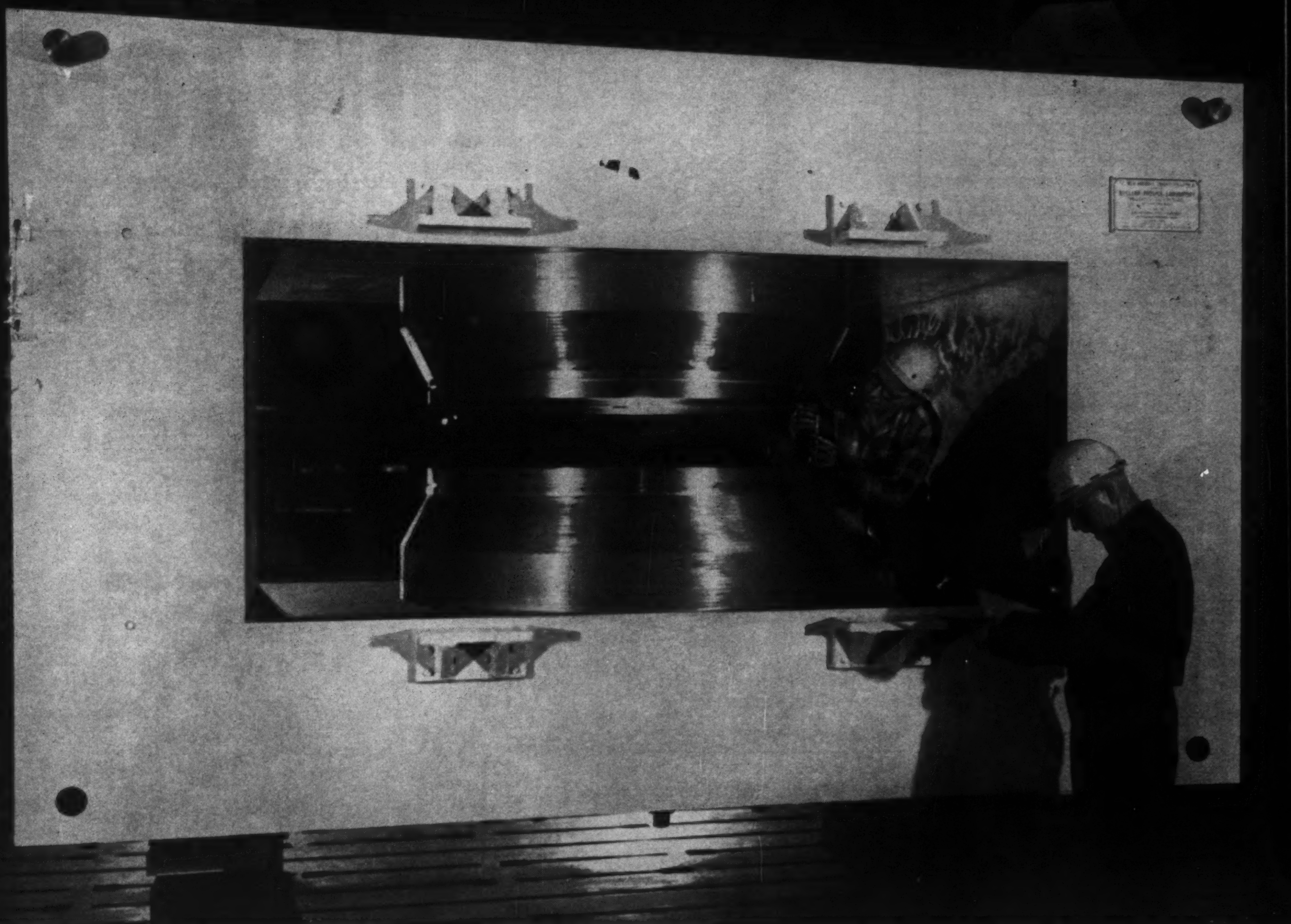

BETHLEHEM INSPECTORS measure the magnetic gap between the pole pieces of a magnet for the new University of Colorado cyclotron.

85-ton magnet for new research cyclotron forged, machined, and assembled by Bethlehem

The core of a new research cyclotron to be installed by the University of Colorado at Boulder is that 85-ton magnet you see above.

To make this magnet accurate and controllable, Bethlehem had to finish the huge magnet parts to thousandths and to micro-inch finishes. Most critical were the pole tips, which had to be machined to parallelism within 0.004 in. on the 52-in. diameter. They were machined a few thousandths oversize, then the final fitting and machining was done.

The forged pole pieces are tapered on the sides from 59 to 52 in. on the diameter, and are 14.4 in. thick. The yoke members, four of them, were forged in a 7500-ton hydraulic press, then machined to 250-micro-in. with mating surfaces finished to 125 micro-in. They weigh 73 tons, and are held together by large dowel pins and studs. They form a rectangular yoke assembly 142½ in. long, 60 in. wide, and 88½ in. high. The opening measures 96 by 42 in.

When completed, the Boulder cyclotron, a strong-focusing type, will have a capacity range of 10 to 30 million electron volts. The electrons will strike a target when their final speed is built up to 1/8 the speed of light.

Bethlehem Steel Company, Bethlehem, Pa. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

The IRON AGE

October 6, 1960—Vol. 186, No. 14

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News of the Industry

DON'T OVERSELL

Know Your Products—It isn't enough that your products do all that you say they will, says Olin Mathieson's M. L. Herzog. Be sure they are best suited to the needs of the users. P. 131

TRADE PROBLEMS

Can Congress Help? — Both houses of Congress are searching for ways to improve U. S. foreign trade without hurting domestic industries. P. 133

NEW DEVELOPMENTS

Big Draw—The Iron and Steel Engineers Show is drawing many steel engineers to look at the latest developments in the industry. Among the top exhibits are those on direct-reduction P. 134

INSTRUMENT CONFERENCE

Floating Atoms—A new microscope enables scientists to study

Metalworking

Cover Feature

HIGH - STRENGTH STEELS—Spend your "High-Strength Steel Dollar" wisely and your products will withstand brutal service conditions. Bethlehem Steel Corp. checks out high-strength metals with precision testing machines. P. 167

atoms in metals. It was displayed at the conference of the Instrument Society of America. P. 135

WEST COAST

Gas Appliance Boom—Gas appliance makers in the Farwest expect a big increase in business in the next five years. Many plan to build larger plants. P. 149

Engineering-Production Developments

HOW TO GET MORE FROM HIGH-STRENGTH STEELS

Choose the Right Ones—Ask a group of metalworkers for a definition of a high-strength steel and chances are you'll get a variety of answers. But despite this confusion, metalworkers are shifting to steels with higher strengths. A rundown of the various strength groups should help you to pinpoint your specific needs. P. 168

Reduce Deadweight — If you're looking for the lowest cost per unit of strength or service life, try the high-strength steels. They will let you do the same job with less steel. Movable equipment, for example, can be made with thinner sections. This reduces weight and increases the payload. P. 171

New Design Concepts — Superstrength steels take over where the high-strength steels leave off. Extra strength is the key ingredient that sets superstrength steels apart from the high-strength group. New trends in industrial design center on the weldability and corrosion resistance of the superstrength-steel series. P. 176

Less Exotic Jobs — An ultra-strength steel usually brings to mind only aerospace applications. However, these metals are also being used more and more for everyday jobs. Can they be the materials you've been looking for? P. 178

Potential Profit — Many factors must be considered before placing an order for a higher strength steel. Always be sure to specify the correct strength group. A sound purchase spells profits all along your product line. P. 181

Market and Price Trends

REPORT TO MANAGEMENT

What's Best Way to Manage?—Modern managers are turning away from the tough method of managing employees. The new approach: Encourage workers to think for themselves and develop responsibility. P. 139

MACHINE TOOLS

Show Business—Industry executives say the recent Exposition was a success. They look for it to produce more domestic orders soon. August machine tool orders rose appreciably from July. P. 151

STEEL SUMMARY

No Change—Little improvement is expected in the next few weeks in the steel market, despite a more hopeful tone. New auto cutbacks contribute to the market pessimism. There is a slight improvement in overall orders, but nothing to cheer about. P. 261

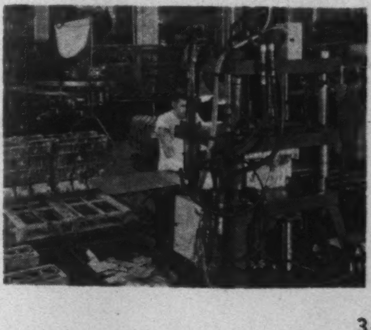
PURCHASING

Industrial Trucks — Leasing is growing in this field. Also, buyers are looking for special attachments that can lick their special problems. Propane gas is coming up strong, too. P. 262

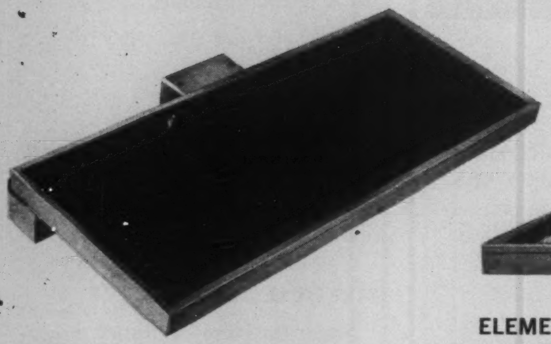
NEXT WEEK

AUTOMOTIVE TRENDS

What's Coming—Next week The IRON AGE looks into the trends in the automaking industry. It takes a look at steel, aluminum, plastic to see which will get greater or lesser use in the autos of the future.

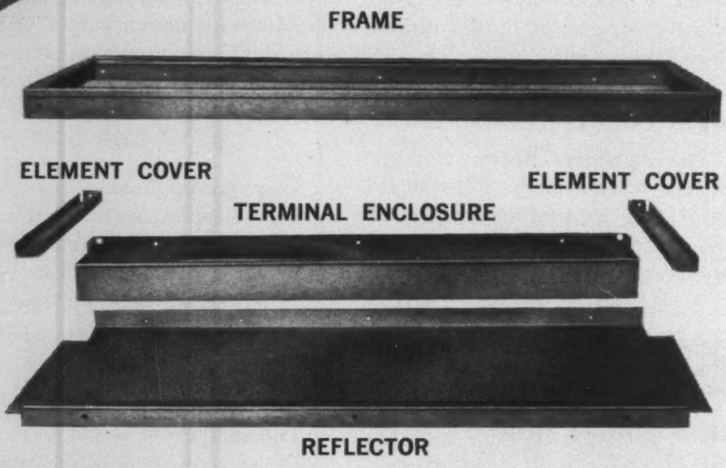


Economical, reflective Armco ALUMINIZED STEEL gives multiple benefits in new infrared heater



COMPLETE UNIT

This new self-contained infrared heating unit is used for drying, baking, curing, and preheating. The heating element is tempered glass coated with an electrically-conductive film. The long-wave-length heat given off is readily absorbed by materials of all colors. All major metal parts—reflector, frame, terminal enclosure and element covers—are made from Armco ALUMINIZED STEEL Type 1.



This new self-contained infrared heating unit heats quickly and uniformly, requires minimum maintenance, remains permanently strong—yet is built at reasonable cost. The reason: nearly everything except the glass is fabricated from Armco ALUMINIZED STEEL Type 1.

Add these features to your products

1. **Heat reflectivity**—ALUMINIZED STEEL bounces back about 80 per cent of radiant heat that meets it.
2. **Strength**—Because they are steel-strong, units remain rigid at operating temperatures even when they are made from lighter gages than are required with softer heat-reflective metals.
3. **Rust-resistance**—A special aluminum coating that guards against corrosion.
4. **Reasonable cost**—Light-gage strength means material savings; elimination of painting speeds production and lowers costs.

Investigate the unique advantages of this material for your products today. Just call the nearest Armco Sales Office or fill in and mail the coupon.

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Government's Role: How Far Should It Go?

Most of us have a hidden urge to let someone else "right" things for us. That's why we say, "Let George do it." Or, "Wait 'til your Father comes home, he will take care of you."

In recent years we have trended toward "Let government do it." That has more effect on our future than letting George do it. The idea is that if things go wrong—or do not go the way we think they should—government should take over. Fortunately, most of these attempts to have government do this or that have not hurt our nation too much. In the nick of time, we see that the job is for us to work under free action instead of under government dictation.

We do have some government roles which may stifle areas of our industry—and, hence, stymie attempts of the nation to grow. Take our railroads: By controlling them with archaic ideas and policies, we are destroying our nation's carriers.

Committee after committee has sounded the warning. Yet our lawmakers seem to be afraid to revamp our laws so that we do not have to deal with 1960 railroad problems with 1900 laws. To delay positive action much longer is against the best interests of our nation. Government has no right to slowly strangle by inaction or stubbornness a national effort such as our railroads.

Our tax laws are another example of government's role leading to economic dangers. It is time our income tax mess is made into something other than a parody of Alice in Wonderland. Our government—Executive and Congress—seems to be afraid to act forthrightly. To delay this too much longer is to make a mockery out of honesty and good citizenship.

While other nations have assisted their industries with realistic depreciation laws, our government has pigeon-holed all attempts to change. Pandering to political fantasies, government has hamstrung our industries for years. This, too, must change if business is to meet adequately the challenges columnists, economists, and politicians love to say it faces.

Strong government—one which acts as a friend and counselor in business and in international trade problems—will sustain our nation in world leadership.

One thing which may help is to use more men of wisdom and experience to man government jobs. But as long as such men are subject to politically inspired baiting, we won't have government in a role which nurtures, aids, and champions a strong and growing nation.

Tom Campbell

Editor-in-Chief

With A-L's Tool Steel Steelector System

HURON
ALLEGHENY LUDLUM DATA STOCK LIST

You Check Warehouse Availability Right At Your Own Desk

How often have you wished that you could bring the tool steel warehouse right to your desk so that you could see what grades and sizes and shapes are available immediately?

The new Allegheny Ludlum STEELECTOR Program does virtually just that. Special Data Stock Lists (18 of them) for each STEELECTOR Grade specify the complete necessary range of sizes and shapes available that will suit virtually all applications. They also list the working hardness of typical applications, temperatures for hardening, tempering, and annealing, plus other data.

You can count on the availability of STEELECTOR Grades. Mill depot and warehouse stocks have been selected and arranged to take the pressure off your own inventory. With the STEELECTOR Program you can select tool steels almost at a glance and be sure that the steel you have picked is in stock—ready for delivery—before you place your order.

Three STEELECTOR Cards make it easy to choose the proper steel for your application. The cards cover tool room, hot work, and high speed grades. The properties of the STEELECTOR Grades are shown by bar graphs for abrasion resistance, toughness, size stability, machinability, and red hardness. You can pick the grade with the particular combination of properties you need just by glancing at the graphs.

The colorful Tool Steel STEELECTOR Booklet gives complete details of the program, explains the Data Stock Lists, and includes the three STEELECTOR Cards. Ask your Allegheny Ludlum sales representative for your copy, or write: *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania. Address Dept. A-10-1.*

STEELECTOR
PROGRAM

ALLEGHENY LUDLUM
Tool Steel warehouse stocks throughout the country

1993

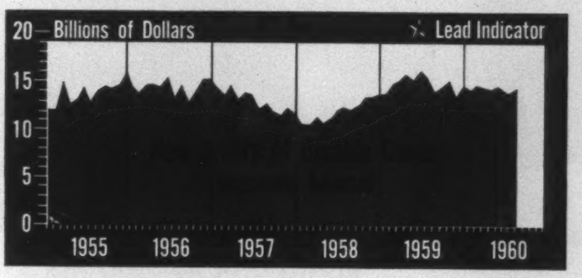
BUSINESS FORECAST

Recession Is Now "Official"

The downtrend in the economy that has been apparent to many in metalworking for some months is now recognized as official by most economists. What kept it under wraps has been government spending, continued high rate of retail sales, and spending for services. But basic metals and durable manufacturers have felt the recession for some time. Remedial measures, such as easier credit, may be expected—now that the overall record shows the downtrend.

Durable Goods Orders Up

Defying the general rule of declining indicators, new orders of durable goods industries gained in August. Also, the $14.3 billion in orders nearly approaches the rate of sales for the month of $14.4 billion. Orders climbed from $13.8 billion (revised) while sales declined from $14.7 billion in July. The revision of new orders, for July, from $14.1 billion to $13.8 billion, probably reflects some of the setbacks during the month.



Meanwhile, durable goods inventories stayed level at $32.0 billion. This reflects the difficulty and resulting lag in cutting back inventories in periods of declining consumption.

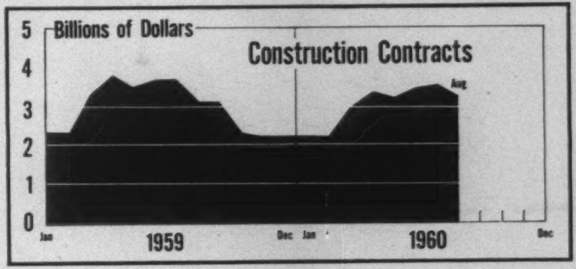
Price Gets Top Consideration

You can expect price to be a big factor in sales, at least until the current correction is over. This is apparent in automotive pricing, which has not been as close in years. Another indication is emphasis on low cost of maintenance. This applies to industrial products as well as consumer lines.

How Many Intend to Buy?

A Federal Reserve Board survey indicates that American families intend to buy cars, washing machines, refrigerators and TV sets this fall at about the same rate as a year ago. The survey was made for the Board by the Census Bureau and will be continued for public analysis.

Construction Tops Year-Ago Rate



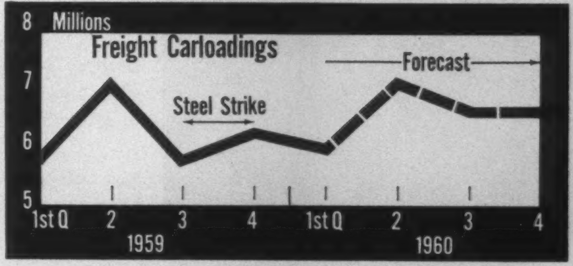
For the first time this year, construction contracts in August went over the 1959 rate for the month. Nevertheless, the F. W. Dodge Corp. total of $3.3 billion was less than the July figure of $3.6 billion. The big factor is in a gain in contracts for non-residential buildings, which were up 22 pct over August, 1959.

Housing Pickup Slow

The upturn in August new home starts may be somewhat deceptive. The pickup, to a seasonally adjusted annual rate of 1.275 million starts, may have been a partial makeup for the July slump. Easier money is on the way, but it will take some time before it will stimulate home building. But some improvement should be evident by spring of 1961, and provide a good stimulus to business then.

Carloadings Hold Level

The nation's railroads expect business to hold about the same in the fourth quarter as in the third. The Association of American Railroads quarterly forecast indicates expectations of 6.4 million carloadings in the fourth quarter. This is up a bit from earlier forecasts of 6.39 million for the third quarter.

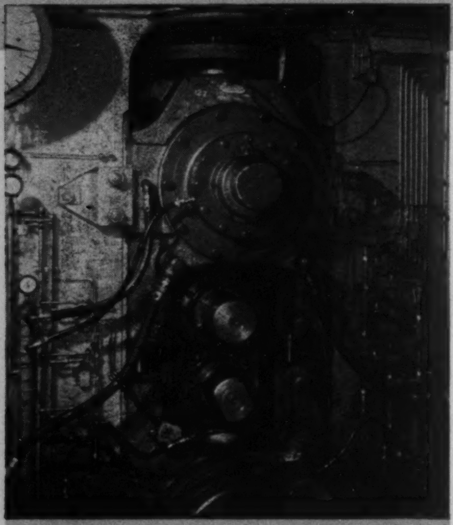


MORGOIL

BEARINGS

Above: 21" x 56" x 56" 4-High, 4-Stand Tandem Cold Strip Mill

Below: 22½" x 56" x 56" 4-High, Single Stand Temper Pass Mill



Meet the DEMAND of TOP QUALITY PRODUCTION

The demonstrated ability to meet high speeds, heavy loads and close tolerances made MORGOILS a natural choice for the back-up rolls on Inland Steel's new Cold Mills at the Indiana Harbor works.

Both the new 4-High, 4-Stand Tandem Cold Strip Mill and the new 4-High Single Stand Temper Pass Mill are equipped with 44"-90 MORGOIL BEARINGS.

MORGAN
WORCESTER

MB 35

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GAS PRODUCERS • EJECTORS • REGENERATIVE FURNACE CONTROL

USWA-UAW: Is 32-Hour Week a Real Demand?

Just how serious are the unions in going after a 32 hour work-week? It was made a goal for the United Steelworkers of America at its recent convention. It has been imposed on the United Auto Workers by militant Locals in the auto industry.

Privately, many among union leadership oppose it, but the man out of work takes the demand seriously. Steelworkers union has to be for it because Locals hard-hit by layoffs are crying for it. The same is true in the auto industry.

Some day the work week will be shorter in these industries. But chances of a 32-hour week soon are dim. Few union people take it seriously—except for political purposes within the union.

Important point: Union membership is actually more militant than union officials on job security. This wasn't fully understood during steel labor negotiations last year. It will be a factor again in 1962.

Company to Pay Union For Moving Plant

Manufacturers intent on moving operations from a high-wage area to a lower wage area will have to be careful when they do it.

In a precedent setting decision, the U. S. District Court in Philadelphia has ordered a "runaway shop" to pay a union $78,011 in compensatory and punitive damages.

The court ruled that the Brooks Shoe Manufacturing Co. violated its contract with Shoe Workers Local 127 when it moved its plant from Philadelphia to Hanover, Pa. Brooks must pay $28,011, representing a probable 20 years of dues lost from 33 employees formerly employed by the company. In addition, punitive damages of $50,000 were awarded.

In awarding the punitive damages, the judge said the conduct violated national labor policy; the union's loss of "prestige" shown by the fact it failed to organize the new plant workers; and the fact that the Hanover plant pays 15 pct to 20 pct lower wages.

A key clause in the contract for 20 years: A provision **forbidding** removal of manufacturing operations away from Philadelphia for **any** reason **during the life** of the contract.

Larry Cool To Summit Meetings

A top steel industry labor specialist has brought into the open his, and probably the industry's, opposition to "summit" talks between company and union leaders.

In a Texas speech last week, R. Heath Larry, U. S. Steel vice president and a veteran of the 1959 negotiations, said summit meetings between management and labor, or tripartite councils involving management, labor, and public representatives, offer no solution to industrial peace.

While not mentioning what many labor experts believe is a lack of progress in joint USWA-steel union committees, Mr. Larry's comments have to be considered in that light.

Commenting on conferences, Mr. Larry points out, "We have tried this kind of thing in the steel industry before—and without much success—but we are trying again." But referring to the Human Relations Research Committee, he says, "we must live in hope that little by little something can be accomplished."

GE vs. IUE: Showdown Here

The long-expected showdown between General Electric and James B. Carey's International Union of Electrical Workers came this week.

In the face of GE's firmest possible stand against yielding an inch from its initial offer—and determination to keep its far-flung plants in operation — the IUE went out on a reluctant strike.

The company had refused to extend the deadline and refused to permit any third party to enter the dispute.

GE says it has agreements or worker approval at four IAM Locals and one or two UAW Locals.

Actually, the GE-IUE battle, in which the company took the initiative and placed the union on the defensive, may be one of the most critical labor disputes since the sit-down strikes of the 1930's.

And the company is in a strong position. The vote to strike was far from unanimous and some locals voted to accept the company's proposal.

The principal issue is company determination not to continue a cost-of-living escalator clause.

Prior to the strike, the company issued general instructions to workers to report for work and what procedure to follow.

Most industrial relations experts expect a tough time on both sides and the issue is expected to be a major test of management's determination to assert, or re-assert, functions many feel it has lost to the unions.

9 trouble-free years—still no trouble in sight

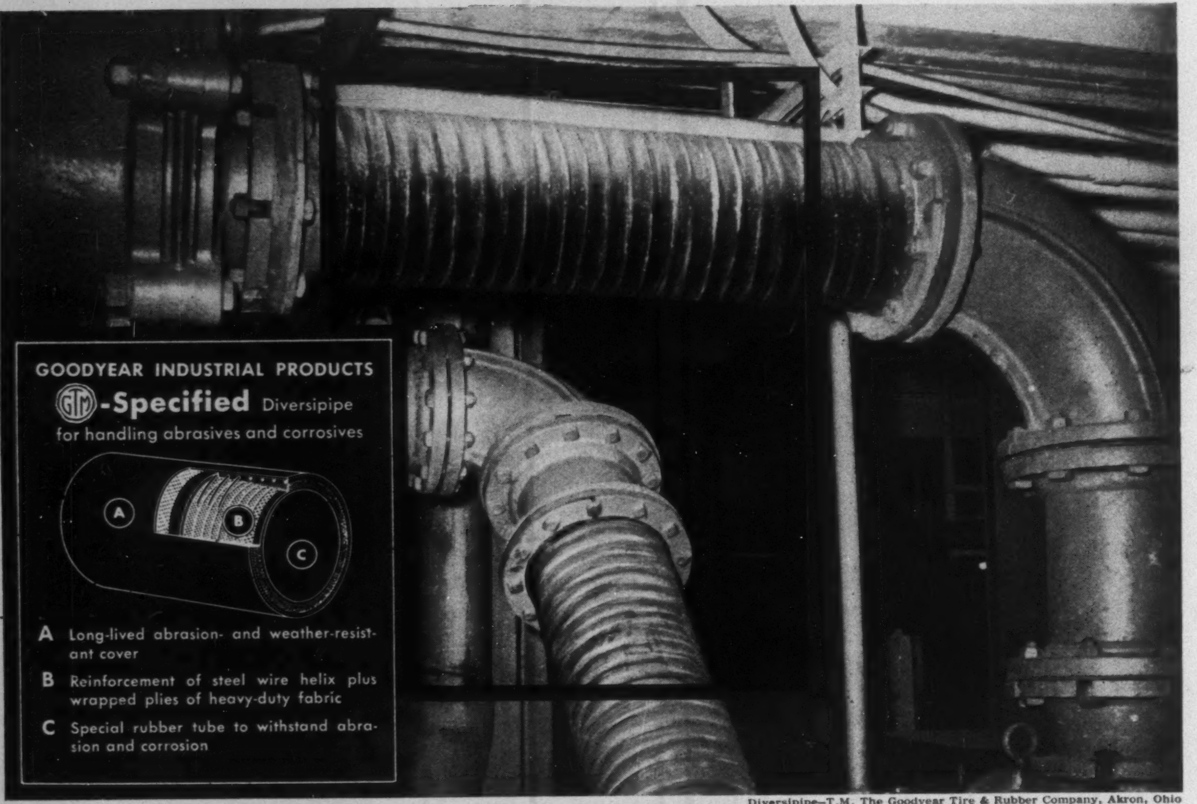
HANDLING the murderous abrasion of iron-ore slurry was only part of the problem when they added new facilities at this big Northeastern mine. There was also incessant vibration from pumps and refiners—certain to encourage leakage and shorten the life of just about any kind of slurry lines used.

But not if the lines were Diversipipe: recommended by the G.T.M.—Goodyear Technical Man. That super-tough rubber pipe fights off abrasion—absorbs shock. A bonus benefit: its flexibility makes intricate installations easier and less expensive.

At last report, the Diversipipe had been handling minus 14 mesh slurry—at 10 feet per second—for 9 straight, trouble-free years. And it's still giving like-new performance.

In fact, Diversipipe has proved the moneysaving answer to tough material-handling problems like this in many a plant. For expert tips on handling pumpable materials—especially abrasives or corrosives—check with the G.T.M. through your Goodyear Distributor. Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*



GOODYEAR INDUSTRIAL PRODUCTS

G.T.M.-Specified Diversipipe for handling abrasives and corrosives

- **A** Long-lived abrasion- and weather-resistant cover
- **B** Reinforcement of steel wire helix plus wrapped plies of heavy-duty fabric
- **C** Special rubber tube to withstand abrasion and corrosion

Diversipipe—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

DIVERSIPIPE BY

GOODYEAR

THE GREATEST NAME IN RUBBER

By R. W. Crosby

★ "Doomsday" Missiles Planned

The government is asking industry to undertake more and more "Buck Rogers" engineering research in weapons. U. S. military leaders have a continuing plan for weapons of the future, which they expect to be operational hardware in the next decade.

The plans call for everything from revolutionary transport vehicles, both land and air, to what the Pentagon calls "doomsday weapons."

Most of the future's fighting equipment means research and development contracts for industry. But "doomsday weapons" would take industry out of the defense business.

Not Idle Talk — "Doomsday weapons," giant nuclear explosive carriers to destroy great portions of a country in one shot, are not idle talk. Military planners are giving them serious thought right now. They would be unbelievably cheaper than present weapons systems—a few hundred million dollars as compared to many billions. They would also be, say Pentagon officials, the absolute deterrent against attack.

Some of these "doomsday weapons" are now on Pentagon drawing boards. And the experts say they may be ready in as little as five years.

The one thing worrying military leaders is that "doomsday weapons" could do away with the need for the present Army, Navy and Air Force.

On the less destructive and less futuristic side, fighting equipment now being planned includes lightweight, high - speed, amphibious troop carrying vehicles and a helicopter which can be controlled from the ground electronically.

■ ICBM Program Off and Running

The intercontinental ballistic missile program is getting back on schedule.

Defense Secretary Thomas S. Gates, Jr., says the program is catching up after a delay ranging up to six months in construction of launching pads.

To further speed up the program, the Defense Dept. has set up a centralized authority in the Pentagon to permit streamlining of design and contracting procedures. The new measures were suggested to Mr. Gates by private industry involved.

■ Detectives by Mail

The Federal Trade Commission is now conducting some of its sleuthing by mail. The Commission uses mail questionnaires to investigate industries suspected of shady practices.

FTC insists U. S. law requires that the queries be answered fully and factually under penalty of fines or jail sentences. Businessmen are protesting it constitutes entrapment. However, the FTC maintains only persons, not corporations, can claim self-incrimination immunity.

■ It's Taxable

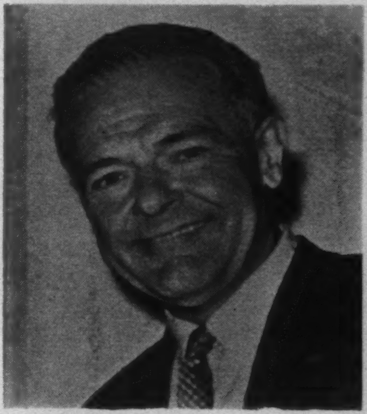
Government payments to industry for minerals and ores under domestic purchase programs cannot be excluded from gross income for tax purposes. This is the ruling of the Internal Revenue Service in advice to a company selling manganese ore to the government.

The government is committed to buy metals, minerals or other materials for use or resale under the domestic purchase program. But, IRS says, this does not entitle sellers to a tax break on the payments received as the purchase price for this material.

■ Is Corporate Tax Revision Near?

Talk of tax reform grows in Washington. Politicians, like Republican vice presidential candidate, Henry Cabot Lodge, are making promises that business will benefit from reform.

Mr. Lodge says the revision of the corporate tax structure would be a matter of serious consideration in a Republican administration. New York's Gov. Nelson Rockefeller is also advocating changes.



LODGE: Serious consideration.

Undoubtedly, Republicans are preparing to look at tax reform if they win in November. But two things should be kept in mind: Looking and doing are two different things. And "reform" is not synonymous with tax "cuts."

Besides possible depreciation tax changes and overseas tax incentives, corporate changes probably won't get too far next year.

The hard-boiled coating that couldn't be cracked

"... boiled in water for one year without film failure or softening", excerpt from Glidden lab report on a special new coating system.

Tortures such as this are common in the Glidden laboratories where maintenance coatings are tested and proven. With good reason, too, because these coatings must stake their reputations on high performance standards.

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Russia Pushes Steel Expansion Program

Russia is pushing plans to boost its steel production to 120 million tons by 1970. By 1965, production capacity is expected to total 91 million tons as a result of a seven-year 100-billion ruble expansion program started in 1958.

This year alone the program provides for the starting of five large blast furnaces, ten large openhearths, three electric furnaces, six large rolling mills, a cold-rolled sheet department, pipe making facilities, and eight coke oven batteries.

These plans were outlined at the Association of Iron and Steel Engineers convention by Ivan Denisenko, economist, Economic Research Institute, and Roman Belan, metallurgical engineer and head of Iron and Steel Industry Dept., State Planning Commission, USSR.

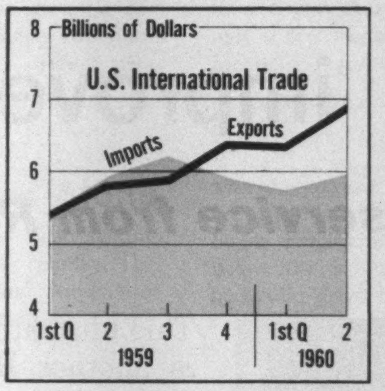
New facilities incorporate advanced steelmaking techniques. For example, all new openhearths use evaporative cooling. The use of waste heat boilers on openhearths is common practice. A 660 ton furnace is under construction; 900 ton units are on the drawing board. Oxygen is being used as it becomes available.

Export Rate Rises Over 1959 Level

Exports have risen to an annual rate in excess of $19.5 billion, an increase of about 30 pct over 1959, says the Dept. of Commerce.

The excess of merchandise exports over imports (both excluding military supplies) rose to a seasonally adjusted rate of more than $4 billion, as compared with $3 billion for the first quarter of 1960. In the second quarter of 1959 the balance was at the lowest point in recent years, with exports and imports about equal.

Imports of merchandise and services in the second quarter of 1960 rose to $5,993,000. Exports of merchandise and services during the second quarter reached $6,867,000. This reverses the situation during 1959 when imports totaled $23,560,000 and exports reached only $23,464,000.



Following the trend of Americans investing abroad, outflow of capital in the second quarter for short-term investment in Europe and Canada, reported by U. S. banks and other business organizations, was $160 million. This is compared to an inflow of $110 million during the first quarter of 1960.

Japanese Scrap Buyers Try to Buy Direct

Although Japanese scrap buying in the U. S. isn't quite as strong as it was expected to be this year, brokers for Japanese scrap users have been paying $2 over the market price for small Midwestern orders.

And now the Japanese are stepping into the situation directly. At least one team from a major Japanese steel company is in the Midwest to discuss direct purchases of scrap, without middlemen.

IFC Ups Investments And Commitments

The International Finance Corp. increased its number of investments by 50 pct and its dollar volume of commitments by 100 pct during the fiscal year July 1, 1959, to June 30, 1960.

The IFC's fourth annual reports says the number of investments increased from 20 to 33, and the dollar volume of commitments from $21 million to $42 million.

The number of countries in which IFC investments are helping finance private enterprises increased from 11 to 17.

Of the 33 enterprises financed, 19 are owned by nationals of the country in which they are located; 10 are joint ventures of local and foreign interests; four are foreign-owned. Twenty of the 33 enterprises financed are for expansion of existing facilities and 13 are for new businesses.

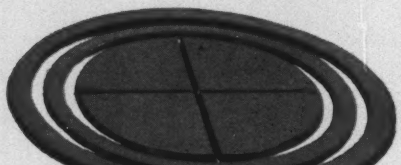
French Develop Economic Plan

French economists have developed a multi-point plan designed to help them compete more favorably in the European Common Market. Authors of the plan are Jacques Rueff, generally given broad credit for the upturn of the French economy under Charles De Gaulle, and Louis Armand, head of the French railways.

Basically, the plan calls for reorganization and modernization of the nation's economy.

The points include: A new licensing agency responsible for trade agreements; decontrol of rents, direct subsidies to wholly or partly-undeveloped areas, and re-adjustment of the tax structure sideways; development of modern distribution and retailing systems.

Stainless cutting



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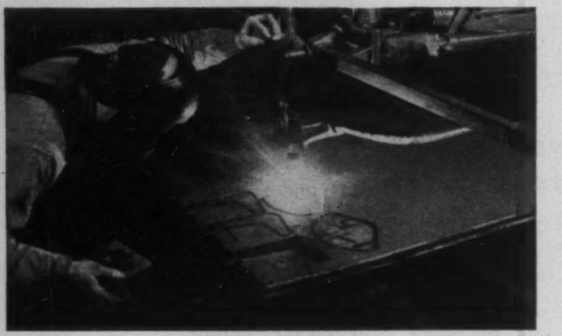
Heliarc-cut stainless



This ultimate in stainless shape cutting is another Ryerson plus service. Ask about this service when the following advantages are important to you:

1 Clean edges free of powder contamination—and even smoother than hack-sawed edges.

2 Easier finishing because edge hardening is minimized.

3 Substantially less carbide precipitation (loss of corrosion resistance) than with any other flame cutting process.

4 Machining greatly reduced or eliminated—edges ready for welding or finishing.

5 Distortion and discoloration held to a minimum

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● Steelmakers Look to New Ideas

The steel industry is well into an era of change. Now ideas for melting, rolling and finishing steel are breaking out one after another. Computer talk is becoming commonplace. Nowhere was this more evident than at the Steel Engineers' Show last week. For steel operating men, equipment makers put on a display that would have been impossible only a few years ago. Here are some of the highlights reported at the AISE Show.

New Process Moves Along

The Dwight-Lloyd McWane iron-making process is gaining acceptance in this country. The process makes use of ore fines and non-coking coal. Also, the equipment on hand in any metal-producing plant can handle the job. Cost figures show savings of over 50 pct per net ton over a modern blast furnace. One plant processes 500 tons of pig iron per day with new method.

Protects Openhearth Roofs

An air curtain is being considered by steel mills as a means of protecting openhearth roofs from temperatures that go with new oxygen practices. Idea is to have a stream of air moving between the roof and the bath. Same principle is used by retail stores in order to leave street doors open and not lose the effects of air conditioning.

Cuts Pickling Pollution

Researchers at Bethlehem Steel describe an automatic bath-composition controller which cuts down on pollution from continuous strip-pickling lines. The problem is caused by a wide fluctuation in bath compositions and by constant drag-out into the rinse tanks. Rubber rolls and water sprays on the strip-exit tank control the drag-out. The automatic controls overcome variations in bath composition.

Furnace Moves to the Job

A rotor furnace for making refined grades of steel points up higher quality while cutting production time. The furnace was designed by the American Demag Corp. Charging, refining with the oxygen lance, slagging off and tapping are done quickly by rotating the entire furnace on its longitudinal axis. The turntable, located below the furnace floor, also has an electro-hydraulic drive for tilting the furnace to a 90° vertical position.

Combination Rolling Mill

Mill stands can be changed in less than a half hour on a new horizontal-vertical combination mill built by Baldwin-Lima-Hamilton for Wisconsin Steel. Designed for high product flexibility, the 12-in. bar mill will permit Wisconsin to carry lower structural shape inventories and change product rapidly. Four working and standby stands can be used for both horizontal and vertical rolling.

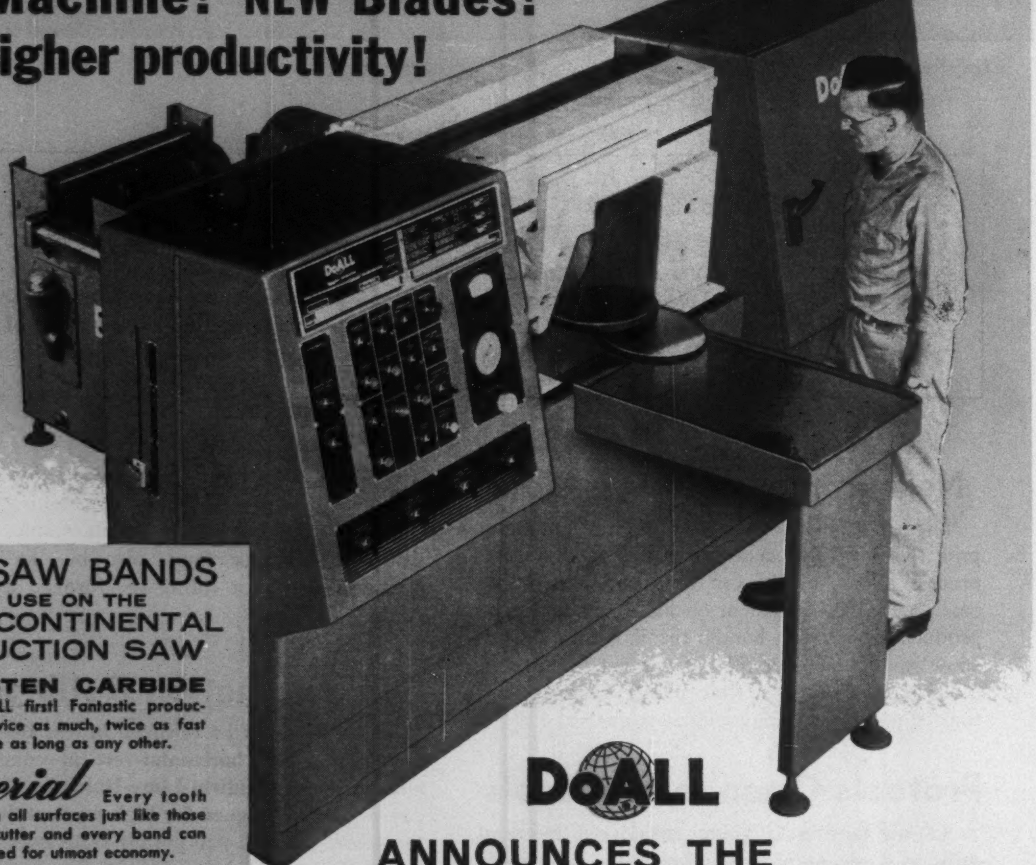
Russians Following Plan

The USSR has a 7-year plan underway to tool their steelmills by 1965. Openhearth furnaces with a capacity of 660 tons are under construction. However, in the works are larger units with capacities up to 1000 tons. They're said to obtain 700-800 and even up to 1000 heats on basic roofs. Present designs call for the use of oxygen.

Checkers Aid Openhearth

Inland Steel Co. reports on the successful design of furnace checkers that were installed in several 320-ton openhearth furnaces. Problems that were once related to the two-pass checker system are solved. It took seven years of study on such items as refractories, high air and high pressure practice, chimney type flues and many others. The result is higher operating efficiency.

NEW Machine! NEW Blades!
NEW higher productivity!



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TUNGSTEN CARBIDE Another DoALL first! Fantastic productivity—cuts twice as much, twice as fast . . . lasts twice as long as any other.

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OTHER NEW SAW BANDS IN DoALL'S GALAXY OF ULTRA-MODERN BLADES

Super Demon An improved type of high-speed steel band gives 30 per cent more cutting for only 10 per cent greater cost.

Demon® The original high-speed steel saw band developed by DoALL still outperforms all other blades in its class.

Dart DoALL's new-type carbon steel saw band . . . guaranteed to outperform any other carbon steel blade.

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Here's another DoALL breakthrough in metal sawing: tomorrow's machine and tomorrow's blades—today! This new high-production team easily cuts mild steel at rates up to 25 sq. in. per minute and less machinable alloys more efficiently than ever before. Built for continuous, heavy-duty work to bring you tremendous savings in time and cost.

NEW DESIGN—Clean, functional styling. Control station at comfortable working height. Straightforward, heavy-duty construction.

NEW ACCURACY—Programmed index system offers micrometer accuracy on every cut. Servo-controlled constant-pressure vertical feed accurately regulates the cutting rate.

NEW FEATURES—New 10 hp hydraulic drive provides infinitely variable band speeds, 15 to 400 fpm. New vise arrangement permits 2½-in. minimum stub ends in automatic operation. High-pressure coolant piped directly to cutting area *through* the guides, which are hydraulically actuated, self-adjusting, zero-clearance, carbide-faced. Automatic chip discharge auger delivers dry chips to full-size waste can.

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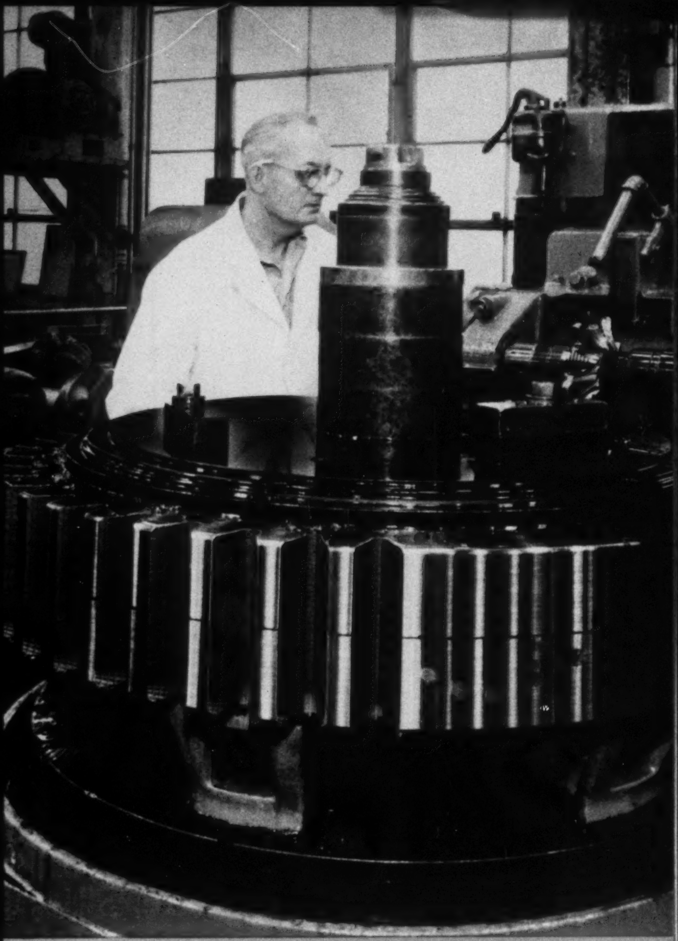
USERS PROVE:

ALCO HI-QUA-LED STEEL FORGINGS CUT MACHINING COSTS UP TO 50%

how three leading companies save money with ALCO Hi-Qua-Led steel forgings



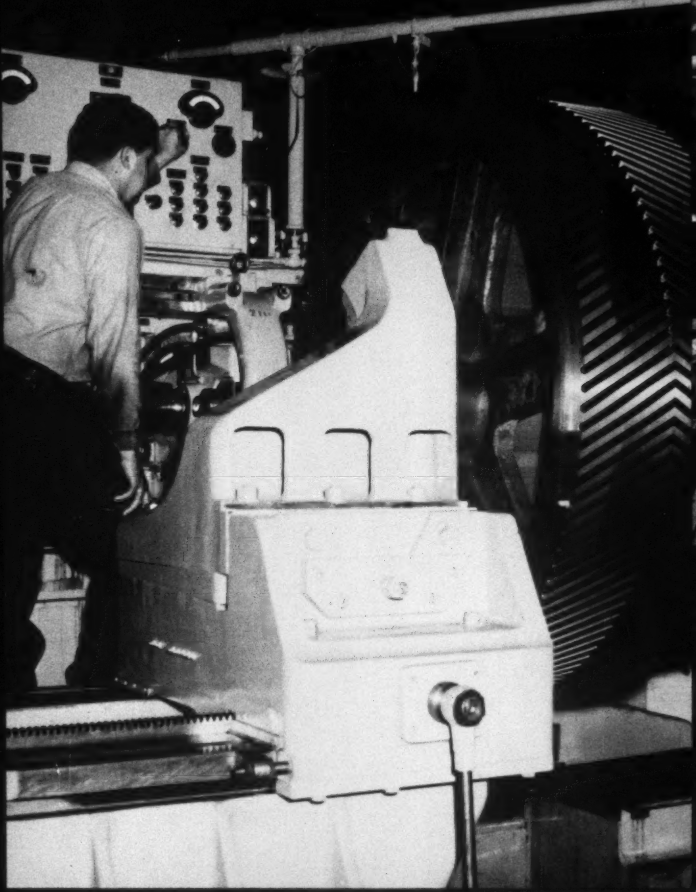
case report:

HI-QUA-LED FORGINGS CUT MACHINE TIME 45%

THE TOOL STEEL GEAR & PINION CO., Cincinnati, achieves large savings in gear-machining operations with ALCO's Hi-Qua-Led Steel forged and rolled rings. On one gear ring, for example, Tool Steel reduced turning time 22% before hardening, and 42% after hardening. Gear hobbing time was cut 43%, rebore 45% and key seating 50%. Average time reduction was 45%.

Hi-Qua-Led forgings machine this easily because of a lead additive which increases shear angle and reduces tool friction. Result: heavier cuts and higher cutting speeds. Expensive tooling lasts longer—five, 10, even 100 times longer.

These big savings are only part of the story. Because Hi-Qua-Led forgings have the same mechanical properties as regular forgings of the same grade, Tool Steel can stand squarely behind its unique guarantee: "Any deficiency made good by cash or new materials."



case report:

HIGHER QUALITY GEARS FOR THE SAME COST

LUFKIN FOUNDRY & MACHINE CO., Lufkin, Tex., uses Hi-Qua-Led forged and rolled rings for 60 in. diam. herringbone gears in its large oil-well pumping units. Previously, cast rings had been used.

Lufkin F&M finds that, although the Hi-Qua-Led rings' price is higher, their machinability cuts the cost of the finished fabricated gear to that of the cast gear. Lufkin is thus able to put a better, more uniform gear in its pumping units for the same cost and provide improved equipment and higher value to its customers.

The table below shows how Hi-Qua-Led rings reduced machining costs at Lufkin F&M.

HI-QUA-LED RING vs CAST RING

OPERATION	CASTING	HI-QUA-LED	HI-QUA-LED SAVINGS
Turning	20 hours	8.1 hours	59.5%
Shape Teeth	80 hours	60 hours	25%
Tool Expense	$75.00	$25.00	67%

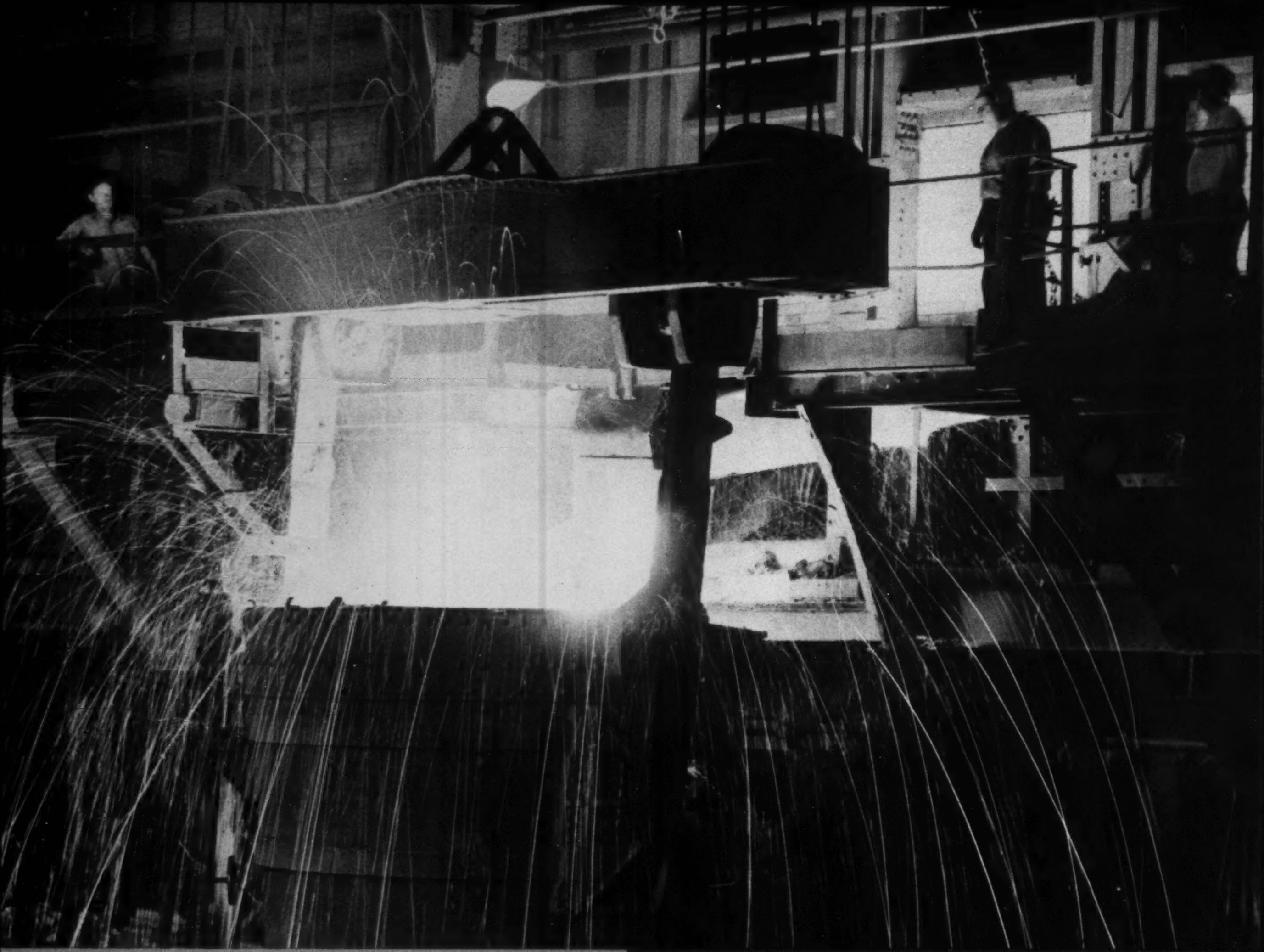
case report:

INCREASED CAPACITY WITH NO ADDITIONAL INVESTMENT

WARNER & SWASEY CO., Cleveland, uses Hi-Qua-Led open-die forged bars for the pentagon-shaped tool holders in their 2AC and 3AC automatic chucking machines. It adopted Hi-Qua-Led for this job three years ago, because it found that machining speeds on every operation—turning, milling, sawing, trepanning, grinding and drilling—could be increased by at least 50%.

The decrease in machining *time* Warner & Swasey gets is about 3 hours per forging. This compensates for the extra cost of Hi-Qua-Led. But Warner & Swasey reasons that Hi-Qua-Led actually expands its production capacity, without any added investment in factory or tools. This is worth about $60 per forging, according to Warner & Swasey figures.

ALCO



ALCO HI-QUA-LED STEEL FORGINGS RAISE PROFIT WITHOUT LOWERING QUALITY

While lowering machining costs, ALCO Hi-Qua-Led forgings have the same mechanical properties as regular forgings of the same grade. "In use" tests show that tensile strength, impact, fatigue and other properties are unchanged. Further, ALCO's exclusive patented lead-addition process guards against lead inclusions or segregates. You get the high quality you expect in custom-forged material.

Hi-Qua-Led Steel rings and forgings are furnished in any steel analysis. If you wish, ALCO will make up your order of regular forgings and include in it a Hi-Qua-Led forging, at no extra cost, for ALCO-supervised tests in your own plant. ALCO Products, Inc., Dept. 1501, Schenectady 5, N. Y.

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Maximum length — 40 ft
Maximum weight — 36,000 lb
Minimum weight — 1,000 lb

MANDRELLED RING FORGINGS

Maximum OD — 82 in.
Minimum OD — 24 in.
Maximum width — 60 in.

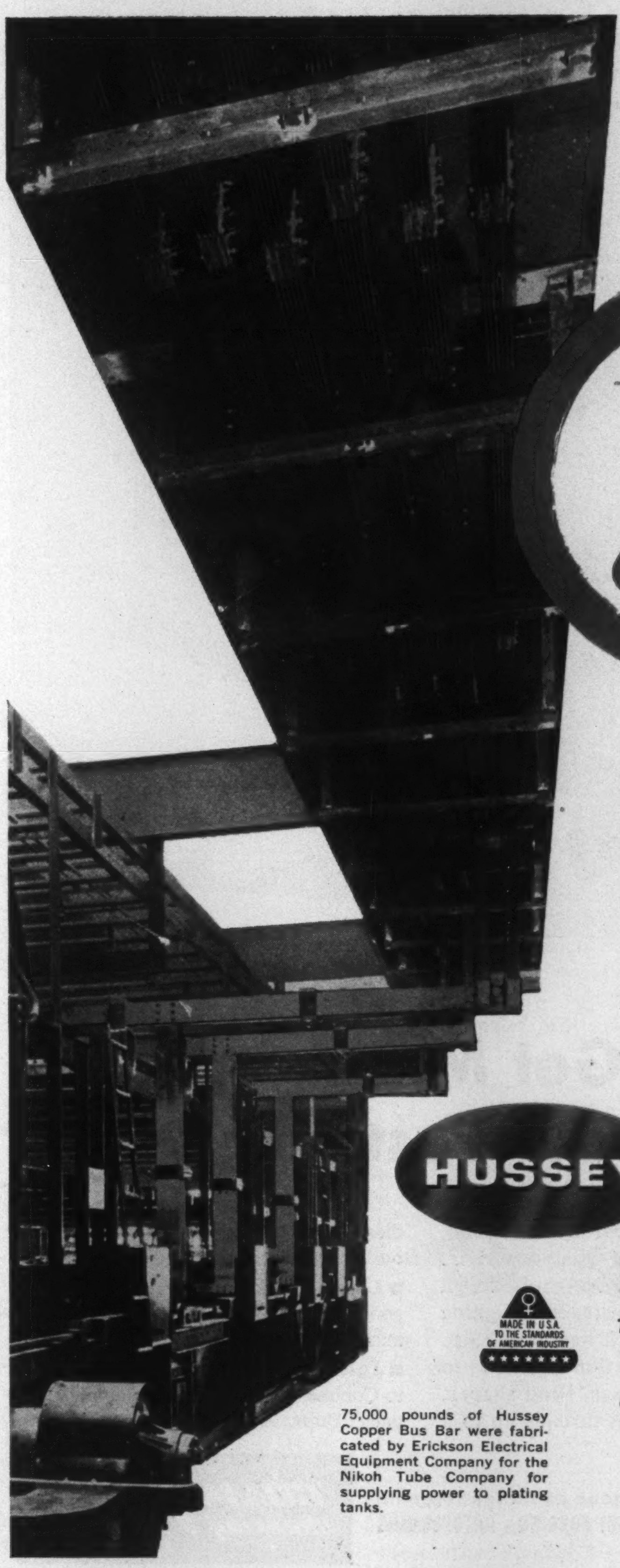
OPEN-DIE FORGINGS — ROUNDS

Maximum OD — 36 in.
Maximum length — 40 ft
Maximum weight — 36,000 lb
Minimum weight — 1,000 lb

ROLLED RING FORGINGS

Maximum OD — 160 in.
Minimum OD — 18 in.
Maximum width — 24 in.

ALCO FORGINGS
ALCO PRODUCTS, INC.



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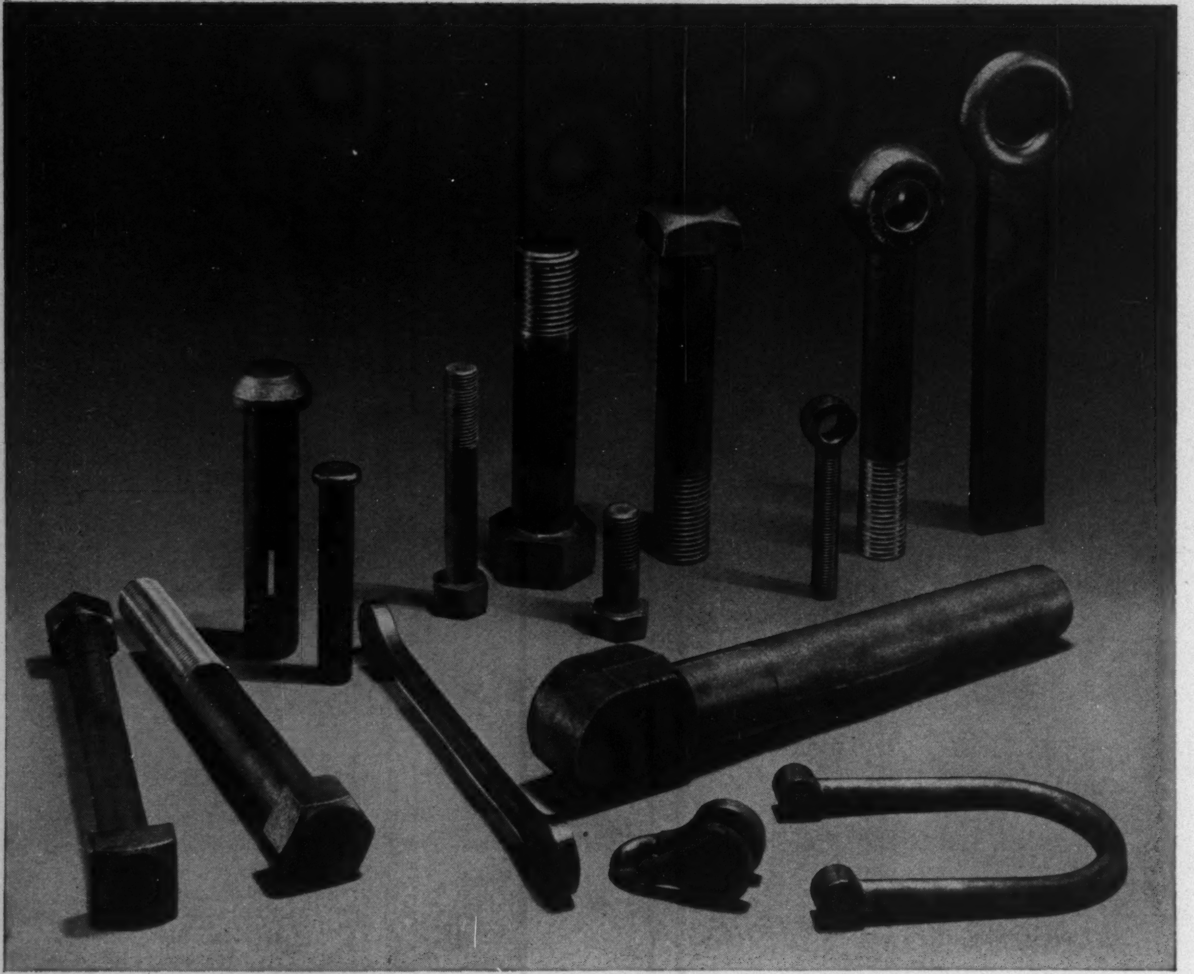

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LETTERS FROM READERS

By Dr. Gaudet

Within ten days after the publication of the first IRON AGE article on reasons for executive failure, by Dr. F. J. Gaudet, we received several hundred letters. Many more are arriving every day, most requesting reprints. Among the comments in these letters are the following: "I found these articles to be most interesting and look forward to reading the other articles of this series."—W. B. F. Mackay, Atlas Steels Limited, Ontario, Can.; "I plan to use these copies for distribution among the members of my management group."—J. E. Anderson, General Electric Co., West Lynn, Mass.; "This is a timely article which it is felt should be retained for guidance."—J. R. Bonnington, Chrysler Corp., Highland Park, Mich.; "This was a most interesting article."—E. L. Breese, Caterpillar Tractor Co., Decatur, Ill.

"We think this is excellent and may be helpful to a number of our people." — Mrs. Chris Freeman, Mississippi Valley Structural Steel Co., Chattanooga, Tenn.; "I have just read your article with great interest."—H. Shahan, Radioplane, Van Nuys, Calif.; "We are requesting copies because of the particular interest this article has aroused."—Mrs. Zeta L. Person, The Heald Machine Co., Worcester, Mass.; "I find these articles most interesting."—J. P. Callahan, Radio Corp. of America, Sommerville, N. J.

"Without a doubt, IRON AGE has done it again. This is the best article of its type I have ever read." —M. Mayer, Corpus Christi, Tex.; "We found the articles by Dr. Gaudet both informative and interesting."—J. J. Jensen, Dominion Foundries and Steel Limited, Hamilton, Ont.; "We appreciated reading this article and in general find all your articles very helpful."—W. J. Cornelius, A. B. Murray Co., Inc., Elizabeth, N. J.; "I have thoroughly enjoyed this excellent article."—H. M. Sherwood, General Electric Co., St. Petersburg, Fla.

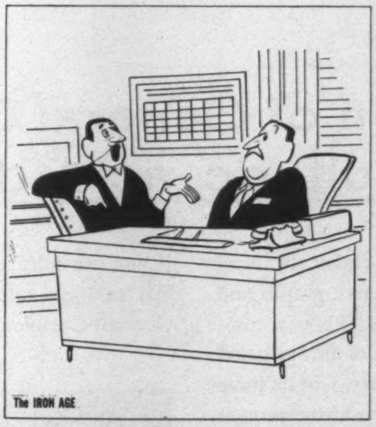
- **The number of requests for reprints has been so great that a new run is now on the presses.—Ed.**

Disturbed

Sir—Both our client, Bradley Semiconductor Corp., and we were pleased to see that you ran a release on their new silicon rectifier in the September 8 issue. However, we are a bit disturbed by the fact that you misquoted the information supplied you. You stated, "Reverse leakage is 4 amp at 25°C and 500 amp at 150°C." This is a very serious error as it should have read "4 u amp and 500 u amp." There is a big difference between amperes and microamperes.—Robert E. Marshall, Claude Schaffner Advertising Agency, New Haven, Conn.

Fascinating Fasteners

Sir—Your article entitled "Special Fasteners" in a recent issue was very interesting. It contains many interesting points and because of the detailed information in several of the sections, I would like to receive two extra copies.—C. A. Gage, Hotpoint, Milwaukee, Wis.



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Furnace Application Engineer, reports . . .

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Type BA-[illegible] "Pil[illegible]" Furnace. Controlled a[illegible]osph[illegible] and cooling . [illegible] straight-through [illegible] Manual or a[illegible] operation t[illegible] F.

Conveyor [illegible]s s[illegible]ough LAC and Humpback BA[illegible]tinuous, automatic, sintering t[illegible]0° [illegible] Zone temp control. Burn-off sections. [illegible] stainless ste[illegible] etc.

Type BA High-Speed Pusher Furna[illegible] — wide-temp[illegible]nge furn[illegible]ering to 23[illegible] available with [illegible]matic, electr[illegible]ic pusher s[illegible] constant t[illegible]perature c[illegible]

Type [illegible]-Temp[illegible] Furnace for u[illegible]ting of ceramic and metal compacts at temps [illegible] 3000° F. E[illegible]al — use [illegible]cing atm[illegible] for clos[illegible] contr[illegible] research [illegible] full scale prod[illegible]

Model [illegible] Vacuum Furnace for high [illegible]m (0.1 mic[illegible] temper[illegible]000° F plus) sin[illegible]ial refrac[illegible]metals—titanium, zirco[illegible], tungsten. High-speed he[illegible] and cooling cycles. [illegible]old wall desig[illegible]age elements.

Atm[illegible] Equipment . . . ammonia dissociat[illegible], endothermic, exothermic, ni[illegible] forming gas generators; Molecu-[illegible] D[illegible] drying protective atmospheres t[illegible] D.P. Designed for controlled, d[illegible] operation.

U[illegible]ye[illegible] experience and equipment to i[illegible] "Results Guaranteed" solution t[illegible] treating or protective atmosphere [illegible]m—to improve your product, reduce spoilage, or speed up production. Write for details.

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HEAT OF DILUTION H_2SO_4 WITH H_2O LIQUID
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Allied Chemical
GENERAL CHEMICAL DIVISION

When sulfuric acid and oleum are diluted with water there is a considerable evolution of heat. Calculation of the temperature rise when acid is diluted may be made with the aid of the Heat of Dilution chart on this page and Specific Heat and Enthalpy charts on pages 24 and 25.

New enthalpy curves . . .
appearing for the first time
. . . enable sulfuric users to
calculate heat developed
and final temperatures when
acid is diluted with water.

Just Out!

New edition of General Chemical's valuable sulfuric acid data book!

Here is a revised edition of General's now-classic technical brochure on sulfuric acid—40 pages of charts, graphs and facts from America's foremost producer. This is a comprehensive technical manual with a wealth of data selected for its practical value to sulfuric acid users. Charts have been revised for easier reference, and up-to-the-minute information has been included on uses, manufacture, properties, storage, handling and methods of analysis. Booklet contains material not available from any other source.

If you use sulfuric acid, you cannot afford to be without this valuable reference work. For your free copy write General Chemical on your company letterhead.

Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N.Y.

FATIGUE CRACKS

High-Strength Steels

Many branches of metalworking are finding that high-strength steels answer their materials problems. Interest is not only centered in the aircraft and missile fields.

More and more research dollars are being spent on these materials. Applications are increasing. As a result, many new products owe their existence to high-strength steels.

Today, equipment can be made to run longer, faster, and even under greater loads. Modern structures withstand brutal service conditions. Smaller, but stronger, products are being continually designed.

Special Feature—to highlight The IRON AGE's Special Metal Show Issue, our editors have chosen high-strength steels for next week's portion of the award-winning series "How to Get More for Your Metalworking Dollar."

What is a high-strength steel? What unique properties must it have? Which steels qualify for this rank? And, perhaps most important, why should a manufacturer switch to these metals?

A steel needn't have a yield point of 200,000 psi to be rated as high-strength. Yield points can range from 50,000 psi and up.

Most of the confusion about high-strength steels is due to the hundreds of new steels which have been developed over the last 20 years. Lack of an accepted definition hasn't eased the problem.

Giant Step—The American Iron and Steel Institute has taken a step towards untangling this snarl. The AISI defines a specific group of structural steels by the label: High-strength low-alloy.

However, there are many high-strength steels that don't fall into this category. Consider the two major steel classifications: Carbon steel and alloy steel. Many of the high-strength steels, for example, are alloy steels.

Multifarious Uses—There's a high-strength steel for almost every application—whether it be a truck body or a missile casing. When you buy high-strength, super-strength, or ultra-strength steels, you receive more than so many pounds of metal. You also get more than just high strength. Numerous advantages can offset the higher cost of the special steel.

Equipment and structures, for instance, last longer due to greater corrosion and abrasion resistance. The ability to design with thinner members boosts payloads. Forming and welding problems frequently disappear when working with these steels.

Made to Order — Switching to high-strength steels means that you can buy the metal with built-in strength and other desirable properties. For many of these steels, heat treatment isn't needed. Thus, equipment costs tumble. And vital floor space is saved.

In addition to the savings, you can also save on handling, preparation and cleaning costs. When you buy steel with prescribed mechanical properties, the quality of your products is maintained at a consistently high level.

Whatever your strength needs, there's probably a job for a higher strength steel in your plant. Even if you're already convinced of the merits of these metals, it'll pay to check and make sure that you're taking full advantage of them.

COMPANY WAREHOUSE
MOTOR FREIGHT
MEL MILLAR
The IRON AGE

"New at this, aren't you?"

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FOR
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R-S CAST IRON PIPE ANNEALING FURNACES USED BY EVERY LEADING PIPE FOUNDRY

For more than 35 years leading producers of centrifugal cast iron pipe have relied on chain conveyor type annealing furnaces designed and built by R-S.

R-S experience goes back to the first centrifugal cast iron pipe produced in this country more than 35 years ago. Since then cast iron pipe annealing furnaces have been a specialty with R-S engineers. Their experience and development of furnaces to meet the needs of annealing cast iron pipe has kept pace with the industry. Today, R-S pipe annealing furnaces offer greater uniformity of heating through all ranges and precision controlled cooling.

R-S pipe annealing furnaces range in capacities from 15 to 35 tons per hour. Write for complete information on the newest developments in centrifugal cast iron pipe annealing by R-S.

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NORTH WALES, PA.

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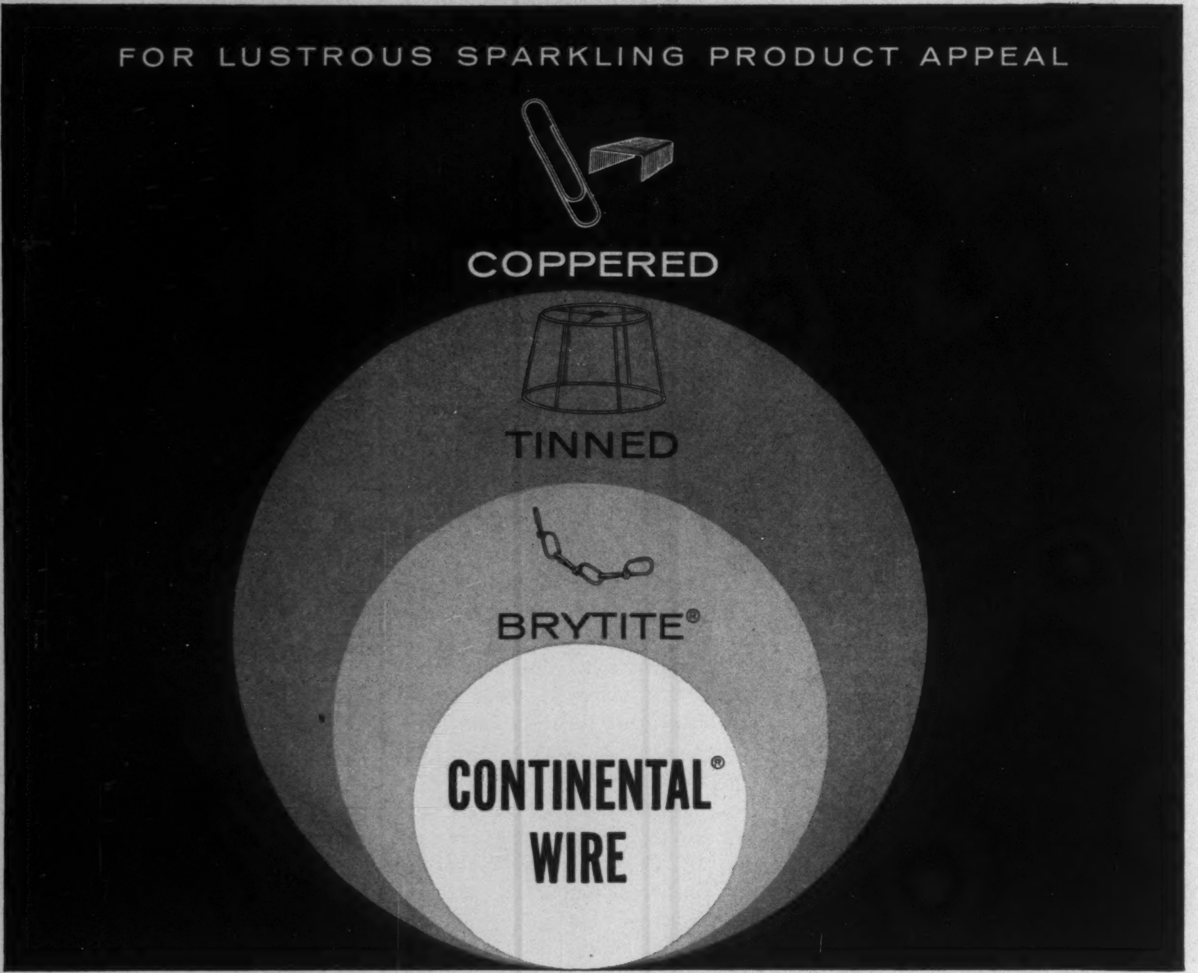
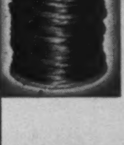


...in special coatings for long lasting fine appearance

MODERN WIRE PACKAGING FOR SPEEDING PRODUCTION

ECONO-COIL®



The single length catch-weight coil that reduces scrap loss and down time in wire fabrication. Continuous length 1500# to 2500#, depending on finish and gage, reduces coil changes, cuts waste.

LEVERPAK or PAYOFFPAK

Modern drum containers protect wire against moisture, dirt; keep wire clean and safe. Handles 500# to 650# catch-weight single length coils, for sizes 14 ga. through 24 gauge. Other sizes on application.

One of these three special finishes may be just the thing to give your product added good looks and high quality appeal. Coppered: Extra smooth finish, for bucket bails, and many items like bag ties, card holders, baggage hooks. Tinned: Unusual brightness and luster, where appearance is important, as in lamp shade frames. Brytite®: Zinc coated wire with the plated look, takes hard turns and twists without flaking or powdering, for chains, display racks, bottle carriers, etc.

Smoothness of surface, lasting luster and uniform workability are hallmarks of Continental Wire, as proved in countless applications. Other finishes, in addition to those above are available, in various tempers and analyses, in low and medium low carbon steel. Your product's sales appeal may depend on Wire-Appeal! Write today for our wire manual.

fine finishes in manufacturers' wire

CONTINENTAL STEEL

CORPORATION **KOKOMO, INDIANA**

PRODUCERS OF: Manufacturers' Wire in many sizes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, BRYTITE, Annealed, Liquor Finished, Bright, and Special Shaped Wire. Also Reinforcing and Galvanized Fabric, Nails, Continental Chain Link Fence, and other products.

COMING EXHIBITS

Mining Show—Oct. 10-13, Convention Center, Las Vegas, Nevada. (American Mining Congress, 1200 18th St., N. W., Washington, D. C.)

Metal Show—Oct. 17-21, Convention Hall, Philadelphia. (American Society for Metals, Metals Park, Novelty, O.)

Die Casting Exposition & Congress—Nov. 8-11, Detroit Artillery Armory, Detroit. (The Society of Die Casting Engineers, 19382 James Couzens Highway, Detroit 35.)

Western Tool Show—Nov. 14-18, Memorial Sports Arena, Los Angeles. (American Society of Tool and Manufacturing Engineers, 10700 Puritan Ave., Detroit 38.)

Power and Mechanical Engineering Show—Nov. 28-Dec. 2, Coliseum, New York. (American Society of Mechanical Engineers, 29 W. 39th St., New York 17.)

MEETINGS

OCTOBER

The American Society of Mechanical Engineers—Rubber and Plastics Conference, Oct. 9-11, Hotel Lawrence, Erie, Pa. Society headquarters, 29 West 19th St., New York 18, N. Y.

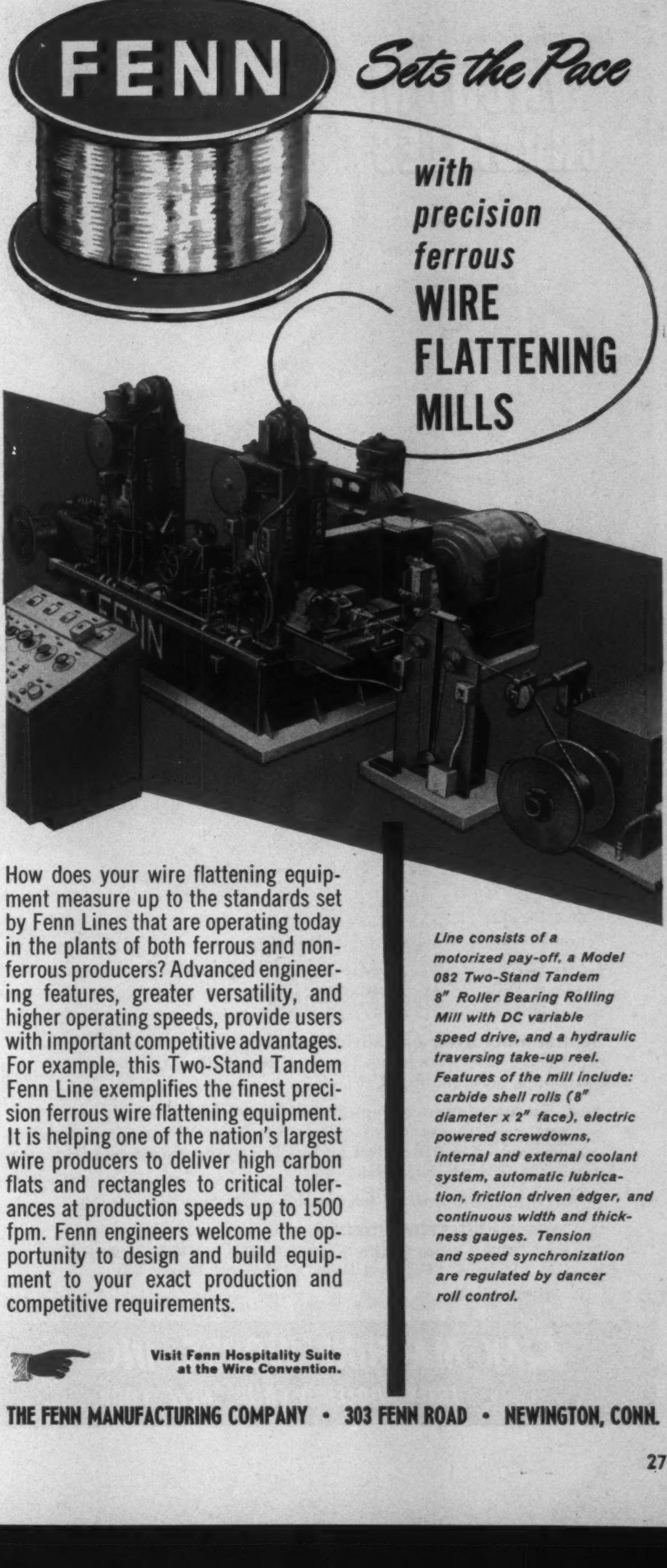
The Electrochemical Society, Inc.—Fall national meeting, Oct. 9-13, Shamrock Hotel, Houston, Tex. Society headquarters, 1860 Broadway, New York.

American Gas Assn.—Annual convention, Oct. 10-12, Atlantic City. Association headquarters, 420 Lexington Ave., New York.

Pressed Metal Institute — Annual meeting, Oct. 10-14, Shawnee Inn, Shawnee-On-Delaware, Pa. Institute headquarters, 3673 Lee Rd., Cleveland.

Marking Device Assn. — Annual convention, Oct. 12-14, Hotel Roosevelt, New York, Association headquarters, 912 Chicago Ave., Evanston, Ill.

Steel Boiler Institute, Inc. — Fall



FENN *Sets the Pace*

with precision ferrous WIRE FLATTENING MILLS

How does your wire flattening equipment measure up to the standards set by Fenn Lines that are operating today in the plants of both ferrous and nonferrous producers? Advanced engineering features, greater versatility, and higher operating speeds, provide users with important competitive advantages. For example, this Two-Stand Tandem Fenn Line exemplifies the finest precision ferrous wire flattening equipment. It is helping one of the nation's largest wire producers to deliver high carbon flats and rectangles to critical tolerances at production speeds up to 1500 fpm. Fenn engineers welcome the opportunity to design and build equipment to your exact production and competitive requirements.

Line consists of a motorized pay-off, a Model 082 Two-Stand Tandem 8" Roller Bearing Rolling Mill with DC variable speed drive, and a hydraulic traversing take-up reel. Features of the mill include: carbide shell rolls (8" diameter x 2" face), electric powered screwdowns, internal and external coolant system, automatic lubrication, friction driven edger, and continuous width and thickness gauges. Tension and speed synchronization are regulated by dancer roll control.

Visit Fenn Hospitality Suite at the Wire Convention.

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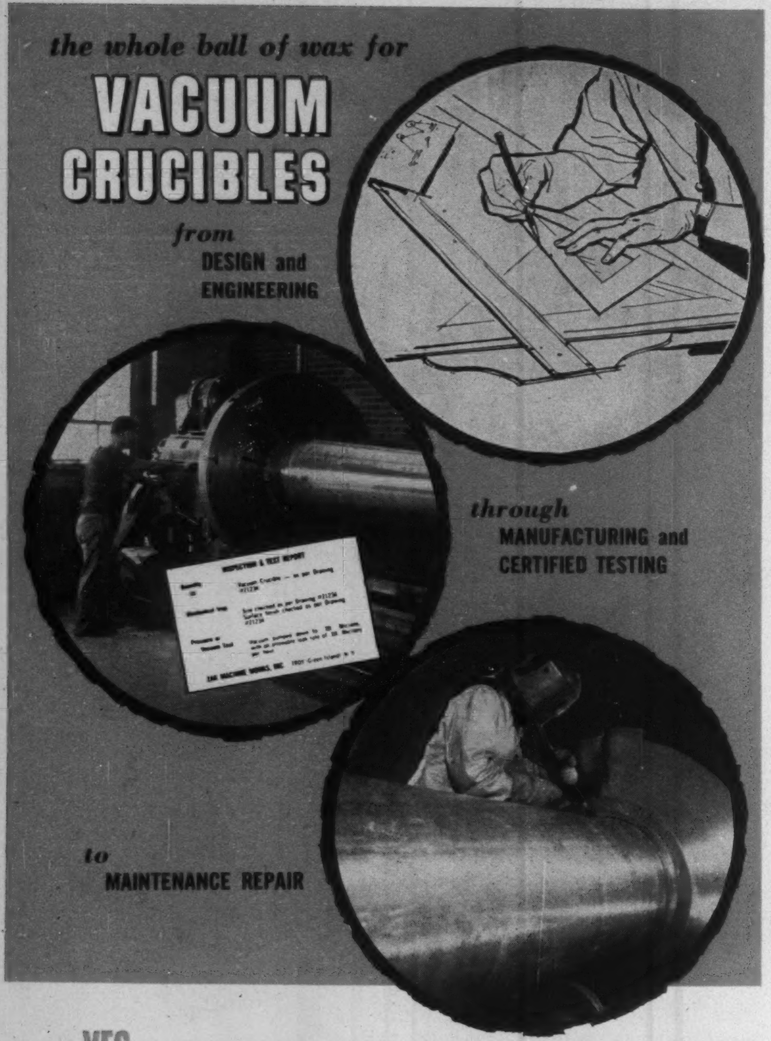

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In the areas of design and engineering of vacuum crucibles our men have helped customers break through knotty technological problems posed by special vacuum applications.

In manufacturing or fabrication, know how gained through experience, has allowed us to cut costs while maintaining our recognized high quality.

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B6U0-2 Button Furnace • CR-58 Crucible • FAC-58 Facilities Folder • IM-59 Ingot Molds • HT-59 Hot Topping Unit

"Engineering Manufacturers for Industry"

ZAK MACHINE WORKS, INC.
TROY (GREEN ISLAND) NEW YORK

MEETINGS

meeting, Oct. 12-14, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, 1308 Land Title Bldg., Philadelphia.

Gray Iron Founders' Society, Inc.—Annual meeting, Oct. 12-14, Netherland Hilton Hotel, Cincinnati. Society headquarters, 930 National City-E. 6th Bldg., Cleveland.

Industrial Management Society—Annual national industrial engineering and management clinic, Oct. 13-14, Conrad Hilton Hotel, Chicago. Society headquarters, 330 South Wells St., Chicago 6, Ill.

Non-Ferrous Founder's Society—Annual meeting, Oct. 13-15, Grove Park Inn, Asheville, N. C. Society headquarters, 1604 Chicago Ave., Evanston, Ill.

Magnesium Assn. — Annual convention, Oct. 17-18, Cleveland. Association headquarters, 122 E. 42nd St., New York.

American Coke & Coal Chemicals Institute—Annual meeting, Oct. 17-18. The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, 711 14th St., N. W., Washington, D. C.

Society for Non-Destructive Testing—20th Annual convention, Oct. 17-21, Philadelphia. Society headquarters, 1109 Hinman St., Evanston, Ill.

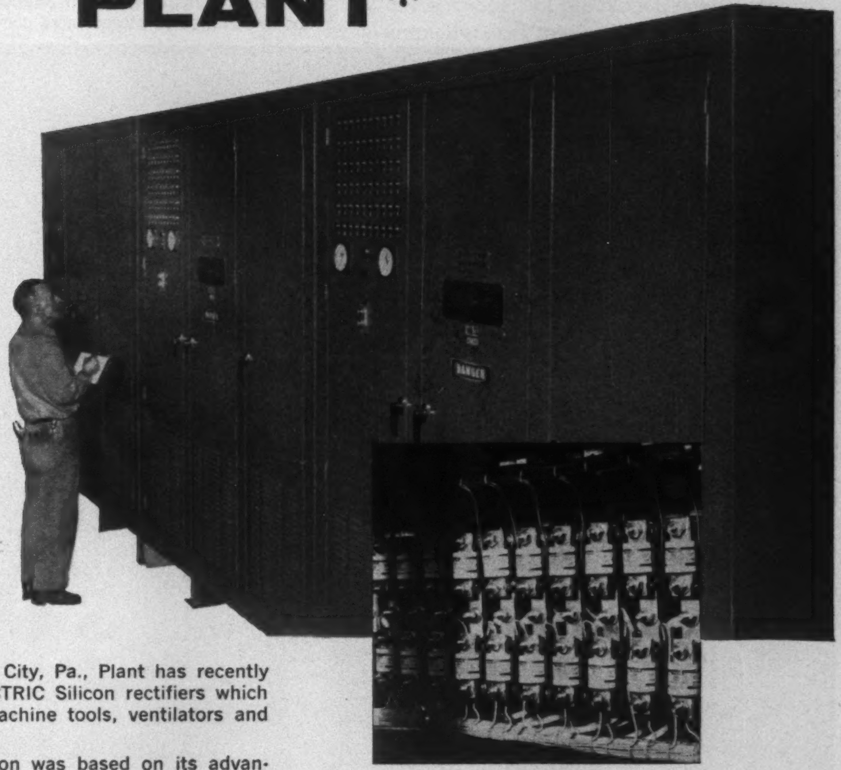
The National Society of Professional Engineers — Fall meeting, Oct. 19-21, Statler-Hilton Hotel, Denver, Colo. Society headquarters, 2029 K St., N. W., Washington 6, D. C.

National Tool & Die Mfrs. Assn.—Annual convention, Oct. 19-23, Leamington Hotel, Minneapolis. Association headquarters, 907 Public Square Bldg., Cleveland.

Foundry Equipment Mfrs. Assn., Inc.—Annual meeting, Oct. 20-22, Greenbrier Hotel, White Sulphur Springs, W. Va. Association headquarters, One Thomas Circle, Washington, D. C.

1500 KW SILICON POWER INSTALLED

at COOPER-BESSEMER PLANT*



The Cooper-Bessemer Corp.'s Grove City, Pa., Plant has recently installed three 500 KW RAPID ELECTRIC Silicon rectifiers which are now supplying heavy cranes, machine tools, ventilators and pumps with d-c power.

Cooper-Bessemer's selection of Silicon was based on its advantageous (inherent) high voltage characteristics and resulting high efficiency and power factor.

Specially designed protective systems, together with Silicon's natural longevity will insure continuous operation for many years (See insert).

For further information on this installation or other silicon installations and applications write or call, Shop Materials Company**, 733 Washington Road, Pittsburgh 28, Pennsylvania.

*Machinery Builders, (Engines and Compressors.)

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CF&I Heavyweight Shaped Coils

PACKAGED for YOUR PRODUCTION

Mr. Marwil points out in-plant handling and unloading is more efficient and economical with CF&I Shaped Coils than with mill coils. Shaped coils can also be stored more compactly.

give long production runs at Marwil Products Co.

With a 12 million unit annual capacity, Marwil Products Co., Fort Loramie, Ohio, is rated as the largest U. S. manufacturer of muffler clamps and U-bolts. Nine months ago the company switched to CF&I Wire. Mr. William Marwil, Vice President tells why:

"We find CF&I's 2000 lb. shaped coils of clean, bright basic wire are very uniform, with no 'thin' areas or rough finish. These large coils give us longer runs without the necessity for frequent set-ups on our Lewis Cut Off machines."

In addition to the high quality of CF&I Wire, new packaging methods have increased the preference for CF&I Wire.

Replacing small, light-weight coils are CF&I Shaped Coils and spiders. The spider, leased from CF&I, acts like a spool, and pays off the wire evenly and smoothly. Now, instead of losing hours of production time every day in changing small coils or unravelling tangled wire, *one* CF&I Shaped Coil can usually last many hours. The shaped coils and spiders make for easier handling and storage, too.

One of our salesmen will be glad to recommend the right "package" to increase your production and cut manufacturing costs. You can call your nearest CF&I sales office today and arrange a "no obligation" visit.

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

CF&I STEEL

7346

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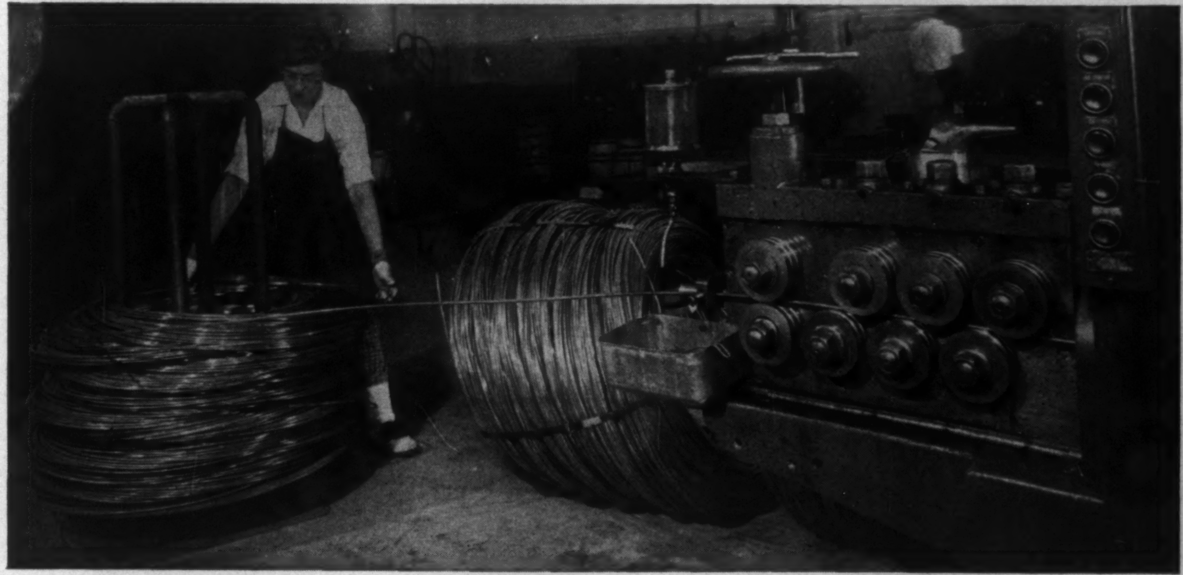
In the East: **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

CF&I OFFICE IN CANADA: Montreal • **CANADIAN REPRESENTATIVES AT:** Calgary • Edmonton • Vancouver • Winnipeg

CF&I Wire being fed into the Lewis Cut Off machine. This machine cuts wire into 5" to 20" lengths at a rate of about 150 pieces per minute.



udylite

research 'punch' breaks through the semi-bright nickel plating barrier!

the udylite corporation

BRAND NEW PROCESS is easier to operate and control, provides better uniformity of color and greater production efficiency than ever before!

here's why:

NO HARMFUL BREAKDOWN PRODUCTS. There are no harmful materials formed from the N2E addition agents as a result of the plating process! Thus, batch treatment is necessary only when contaminants from other sources enter the bath and continuous carbon filtration will not remove them. The result is a substantial saving in solution, downtime, manhours and additional chemicals ordinarily required to treat and rebuild the plating bath.

CONSISTENT UNIFORMITY. N2E addition agents are noncritical in concentration. Reasonable variations from recommended concentrations will not seriously affect the characteristics of the deposit. Overall uniformity of color is maintained. Even in deep recesses on the backs of intricate die castings, amazingly clean deposits are obtained.

WIDE CURRENT DENSITY RANGE. N2E's average current density range is 30 to 60 amperes per square foot, with a considerably higher limiting current density. This wide range permits faster plating at a higher average current density without burning.

GREATER TOLERANCE TO METALLIC IMPURITIES. The absence of harmful breakdown products is of special importance in connection with metallic contaminants, since the undesirable effects of the two are cumulative. Another N2E 'plus' factor that helps maintain uniformity and quality.

ADHESION GREATLY IMPROVED. Production experience over a considerable period of time has conclusively demonstrated the excellent adhesion characteristics of Udylite N2E in combination with the Incomparable '66' Bright Nickel Process.

ECONOMICAL CONTINUOUS FILTRATION. One of the outstanding advantages of N2E is the fact that the bath can be continuously filtered through an activated carbon pack without appreciable loss of brighteners. The cleaning action of the continuous carbon filtration permits long periods of uniform, high quality production. The stability of N2E addition agents also permits economical bath purification by low current density electrolysis.

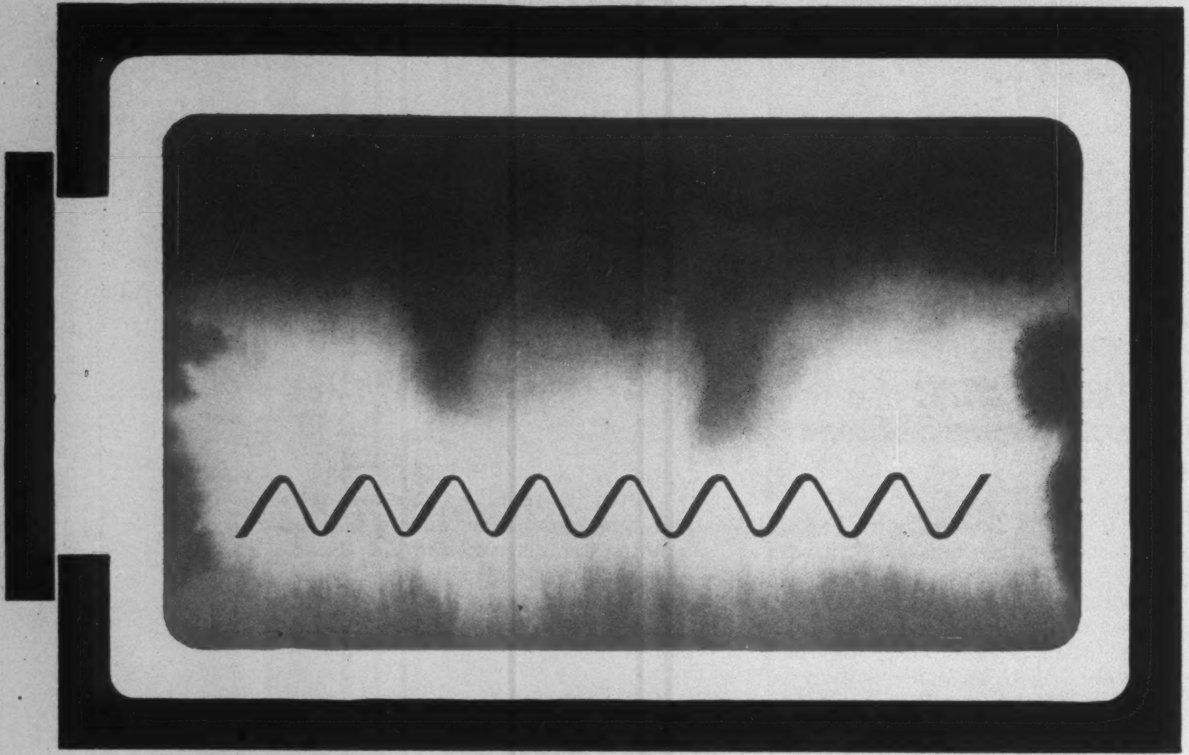
CAN BE ADDED DIRECTLY TO BATH. N2E addition agents are liquid and can be added directly to the bath without the use of filters. For high-speed operation, air agitation of the bath is recommended, although N2E performs well with mechanical agitation and can even be used without agitation.

See for yourself what N2E can do to improve your plating operation. Submit one of your problem parts for test plating now. See your Udylite representative. Or, write or phone:

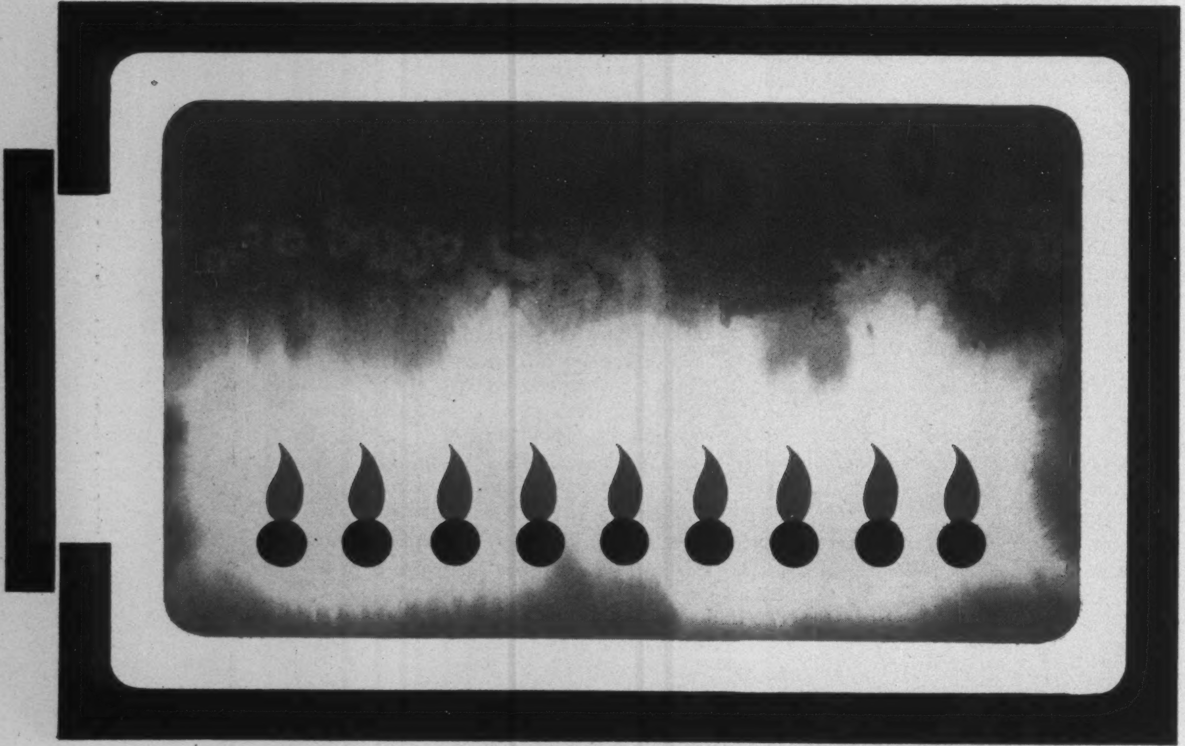
detroit 11, michigan. on the west coast: L. H. Butcher Co.

world's
largest
plating
supplier

udylite



Honeywell can put your



If you're planning to put a new electric or fuel-fired furnace on the line, a Honeywell control package will save you installation time and assure you of the best possible results. *(The package consists of a complete furnace control system and all the application engineering, installation and maintenance assistance you require.)*

Honeywell makes *all* types of furnace controls, including complete saturable reactor systems, master-slave program systems and flame safeguards.

new furnace to work faster, better

Control panels and cubicles are custom-engineered, and arrive at your plant already piped and wired. Honeywell will do the whole installation or provide standby supervision, as you prefer.

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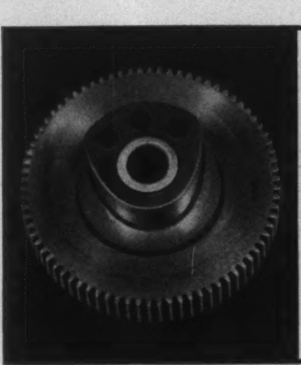
THE AMPLEXOLOGIST

The Amplexologist is sometimes detected about to pocket a part in a prospective customer's plant. Especially a part being machined from a rough casting or hogged out of steel. Just the sight of it starts wheels whirling in the Amplexologist's head.

Why all the machining? Is this scrap necessary? Could we make the part out of powder metal? Eliminate machining costs. Eliminate scrap. Deliver a finished precision part for the price of a rough casting. Less, maybe?

Well! Thoughts like these are enough to make the Amplexologist forget his mother's maiden name. No wonder it sometimes takes a pointed stare to remind him to ask permission to pick up the part and take it back to the office and figure precisely how to make it better and cheaper through advanced powder metallurgy.

Customers usually forgive him the sins of his enthusiasm. It has saved them thousands of dollars. We can afford to forgive him, too. He has helped make us the world's largest, most experienced producer of powder metal parts. He is the reason manufacturers say: **When it comes to powder metallurgy—Amplex has the answer.**



FOR THE BENEFIT OF SKEPTICS . . .

The part shown is a combination gear and compound cam. Formerly, it was an 8-piece assembly: fibre gear, steel flange, horizontal steel cam, vertical steel cam, four steel screws. Then the Amplexologist went to work. Today, the part is produced by powder metallurgy as a single unit—a finished precision part that requires no machining.

Cost reduction: about 90%. What's more, the powder metal part provides longer wear, quieter operation.

Photograph permission RCA.

AMPLEXOLOGIST

SEND COUPON . . . **if you'd like to talk over your product with the Amplexologist. Don't hesitate. He's always happy to get out of the office.**

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Please have the Amplexologist call to look into the possibility of using powder metal parts in our product.

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Nearly everyone in metals will be in Philadelphia October 17

"Because of the time demands of my own job, it is only logical that if I can find one place and one time where I can bring myself up to date on what's new in metals, that's the place I want to be. The 1960 Philadelphia Metal Show will provide a meeting place where I can obtain—through conversation, through exhibits, and attendance of technical sessions—the latest information and engineering data on metals and related materials."

George F. Stradar,
Chief Metallurgist
FAIRCHILD CAMERA & INSTRUMENT CORPORATION

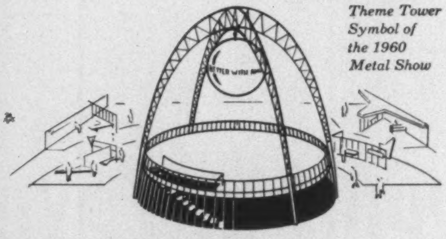
"ASM brings together in one place and at one time the year's most important developments in the technical and practical aspects of the metals industry. Never have I left a show without several ideas for applications of materials, equipment or processes in my engineering work. The 1960 Metal Show promises me more 'take home' than ever."

Raymond J. Hibbeln,
Dept. Chief, Product & Development Engineering
WESTERN ELECTRIC COMPANY

That's how important the 1960 Philadelphia Metal Show will be . . . not only to the recognized leaders but to those on the way up in metals and materials technology. Everyone will look to this event as a vital concentration of the latest thought and achievement. Your participation is a must for keeping technologically up to date, and the Metal Show does meet this need. This year a new emphasis on metals and materials, processes and techniques will be presented by 300 exhibits and 250 technical papers. PLAN NOW TO ATTEND!

"The Metal Show gives me several essentials for my work: science and discussions with scientists through the weekend seminar; science and engineering through the sessions of the several societies; and finally applications of knowledge and know-how to products through the Show. Most valued are the friends and the stimulating discussions with them."

John P. Howe,
Research Director
Atomics International
NORTH AMERICAN AVIATION



Theme Tower Symbol of the 1960 Metal Show

NATIONAL METAL CONGRESS and EXPOSITION

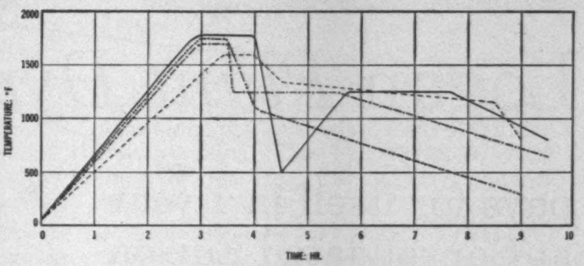
Philadelphia Trade & Convention Center • October 17-21

Sponsored by the AMERICAN SOCIETY FOR METALS *Metals Park • Novelty, Ohio*

Cooperating Activities: The Metallurgical Society of AIME; Society for Non-destructive Testing, Inc. Associations presenting technical sessions in cooperation with ASM: Metal Powder Industries Federation; Metal Treating Institute; Ultrasonic Manufacturers' Association; Industrial Heating Equipment Association; Special Libraries Association—Metals Division; American Society for Testing Materials—Committee B-9; and extensive research and engineering programs of the American Society for Metals, and ASM Seminars.

SELECT YOUR PRODUCTION AND DIAL YOUR CYCLE . . .

with this Salem-Brosius Continuous automatic cycle annealing furnace



Salem-Brosius cycle annealing and other heat treating furnaces are engineered to conform to your most exacting product specifications. Wide range heating and cooling cycles can be varied quickly and programmed positively—with a single operator—permitting you to handle a range of heat treating jobs with a single furnace. Such furnaces are built for continuous operation or as batch types, with conventional firing or controlled atmospheres. Your requirements govern design.

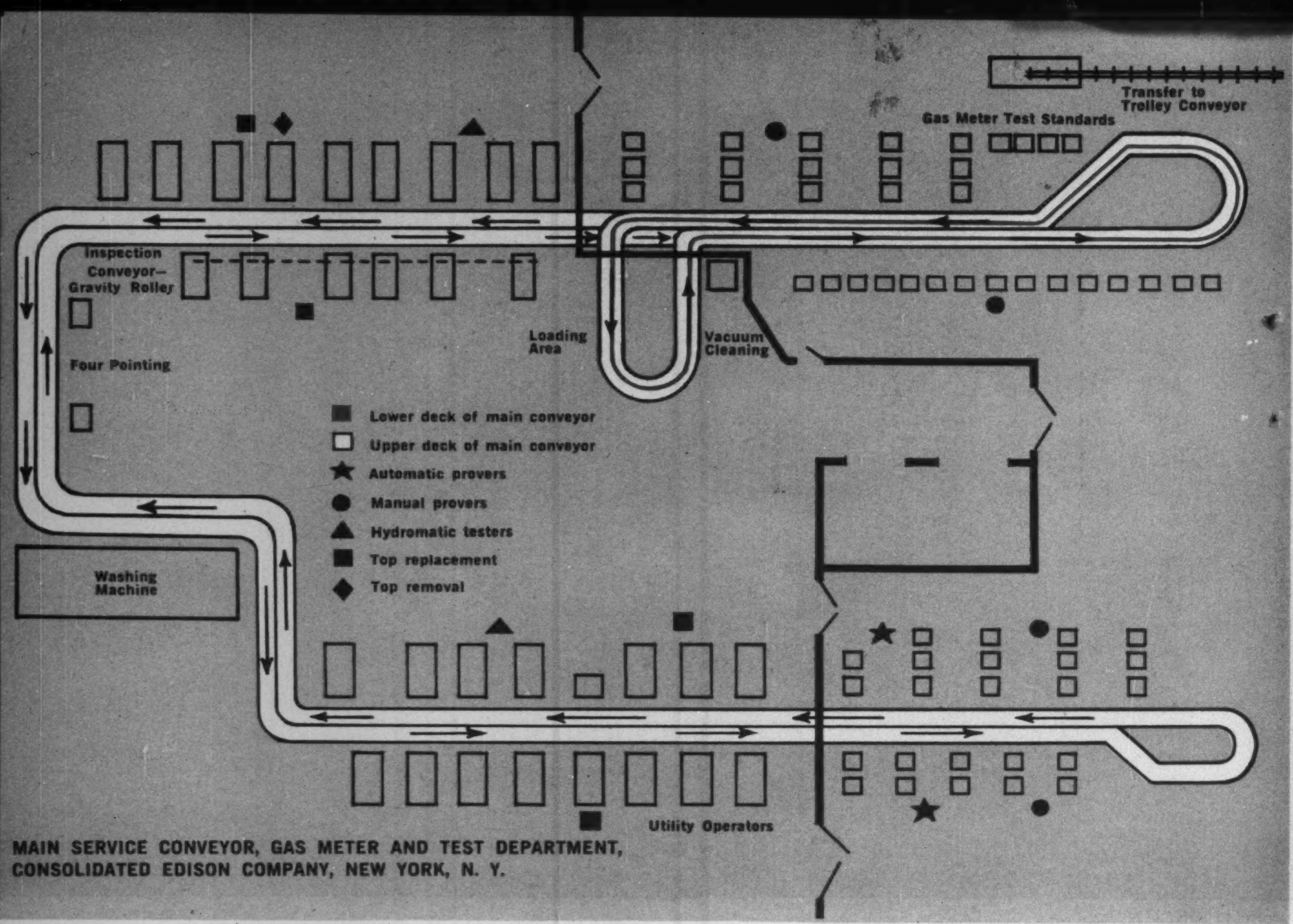
Both in the United States and abroad, Salem-Brosius is recognized for its outstanding design and construction of industrial furnaces—furnaces that yield maximum high-quality output at minimum capital, operating and maintenance costs.

When you need heating or heat treating furnaces, check with Salem-Brosius for advanced design and common-sense construction.

Salem-Brosius, Inc.

PITTSBURGH, PENNSYLVANIA

Salem-Brosius (Canada) Limited, Rexdale, Ontario • Salem-Brosius (England) Limited, London and Milford, England
Salem-Brosius (France) S.A., Paris, France • Salem-Brosius (Luxembourg) S.A. • Alloy Manufacturing Corp.,
Pittsburgh, Pa. • R. H. Freitag Manufacturing Div., Akron, Ohio • General Ionics Corp., Pittsburgh, Pa.

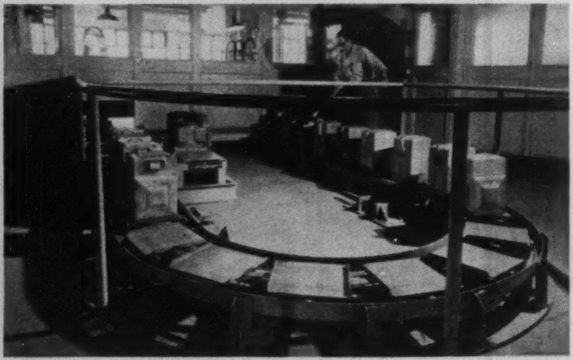

Transfer to Trolley Conveyor
Gas Meter Test Standards
Inspection Conveyor—Gravity Roller
Four Pointing
Loading Area
Vacuum Cleaning
Washing Machine
Utility Operators
▨ Lower deck of main conveyor
☐ Upper deck of main conveyor
★ Automatic provers
● Manual provers
▲ Hydromatic testers
■ Top replacement
◆ Top removal

MAIN SERVICE CONVEYOR, GAS METER AND TEST DEPARTMENT,
CONSOLIDATED EDISON COMPANY, NEW YORK, N. Y.

Logan *Plant Dynamation* System

pays for itself in 1 year at Consolidated Edison

Loading area, where incoming meters are placed on the 202-ft. lower deck of the main service conveyor. Both decks are carousel type, chain-on-edge driven conveyors. Specially designed individual carriages hold one larger-type meter, shown here, two of a smaller type also serviced.

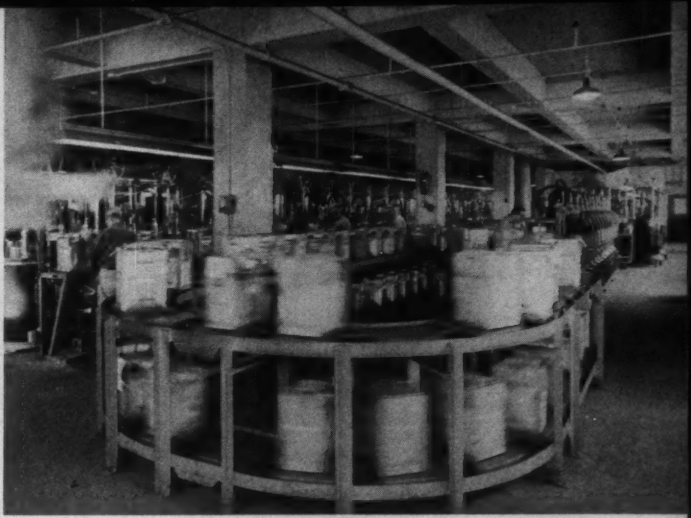


When 1200 feet of chain, trolley, belt, and roller conveyors pays for itself in a single year, usually the reason is better engineering. Consolidated Edison Company, New York, N. Y., enthusiastically supports this explanation of the success of the Logan system installed in its Gas Meter Shop in mid-1959.

From the first planning stages, the Logan Plant Dynamation specialist collaborated with Consolidated Edison on the ingeniously simple conveyor system and revised department layout shown here. The system mechanizes work flow on scheduled maintenance checks of about 4,000 gas meters per week. Meters previously were moved through the department by hand-truck.

Benefits and savings are reduced labor costs, space savings, continuous production, new versatility to meet shifting needs, minimized damage to meters, better safety conditions and reduced fatigue for workers. The conveyors have required no maintenance other than periodic lubrication and servicing.

Here the double-decked portion of the main service conveyor carries meters through an incoming test section. A tag applied here designates service steps to be performed as each meter carousels through the shop. Any incoming test bench and worker can be switched to final testing or meter adjusting, when relative work loads so dictate.



One end of the two elongated merry-go-rounds, seen from the trolley conveyor transfer point. Since the conveyor is a moving work bank for the individual benches, a meter may pass this point more than once before being transferred from the lower deck to the upper deck or out of this system to the trolley conveyor.

Dispersal and de-specialization of work proved to be surprise keys to the dynamics of numerous bench-work steps performed on the meters. Incoming meters are removed from the lower section of the double-deck main service conveyor, tested, then placed on the 720-ft. upper deck. This conveyor loops continuously among all the work bench areas. However, each step is performed at two or more separate points. Thus, meters are removed and replaced a few at a time, eliminating lengthy waits. Frequently-varying needs are met by certain benches and workers prepared to perform any of three steps on demand.

A tag system designates steps required on each meter. The meters are continually moved back and forth between the benches and main conveyor, but all handling is at one convenient level once meters have been placed on the upper deck.

After internal servicing, a 240-ft. continuous trolley conveyor takes the meters down two floors, through a degreasing installation and a paint booth. They are re-sealed on a final section of Logan belt conveyor, which carries them to shipping.

Logan conveyor design helps harness all the work power potential of your plant

A number of different conveyor systems might pace your process "efficiently." However, between the *least* efficient and the *most* efficient of these, many thousands of dollars can be gained annually in bigger output and lower costs.

The Logan technique of Plant Dynamation eliminates hit-or-miss from conveyorizing. The Logan engineer helps you analyze your operation's *basic work-power patterns* . . . then moves step by step to design the *one right* system dictated by these patterns.

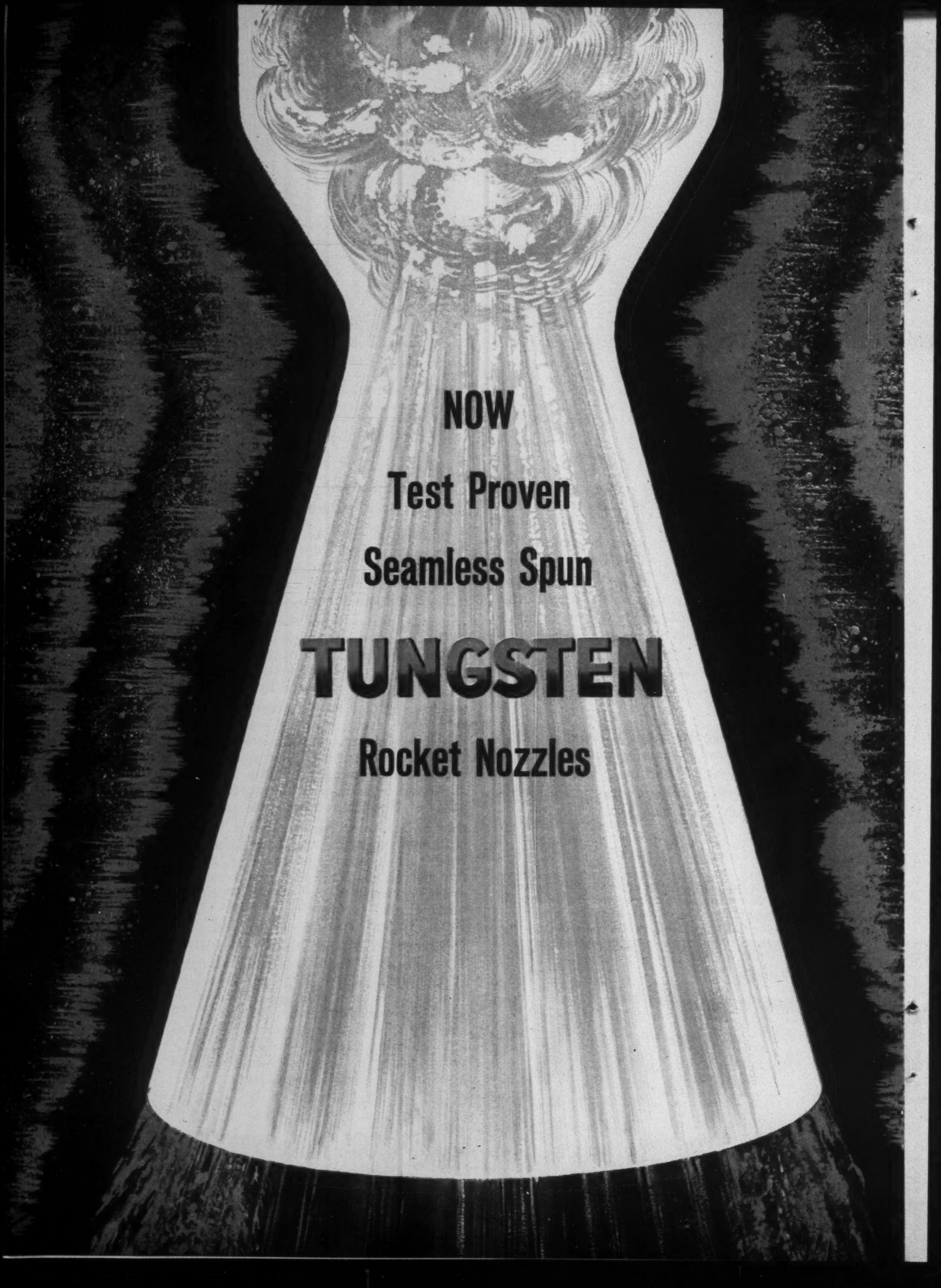
Over the half-century in which assembly-line production itself has grown up, Logan engineers have developed and proved their exclusive Plant Dynamation technique through thousands of custom installations. On an average, "The Man From Logan" stationed in your area has participated in fourteen years of this vital experience.

One of the most comprehensive lines of conveyor equipment permits the Logan engineer to specify freely. Both as supplier and designer he commands five distinct modes of power and control: gravity, electricity, hydraulics, pneumatics, and electronics. Every "Man From Logan" has made original contributions to the concept of automation.

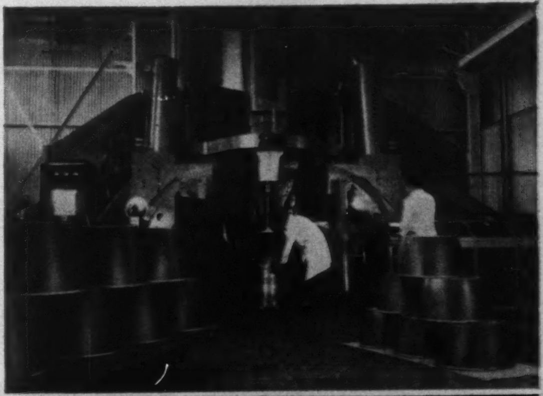
"The Man From Logan" stationed near you is quickly available. It pays to include him in the early sessions of new-plant or plant-revision planning. And he works directly with your engineers through installation to smooth operation. Write or phone today for a conference with this specialist in Plant Dynamation.

Logan Conveyors

LOGAN CO., 545 CABEL ST., LOUISVILLE 6, KY.


NOW
Test Proven
Seamless Spun
TUNGSTEN
Rocket Nozzles

Marquardt Provides Unique Advanced Materials and Structures Capability for Space-Age Demands



Seamless spun tungsten rocket nozzles have been developed and produced by Marquardt's Advanced Materials and Structures Department. Capable of withstanding the severest combustion environments, these test proven nozzles exemplify Marquardt's continuing materials and structures state-of-the-art advances. In other critical areas, too, Marquardt's unique ability to combine metallurgy and advanced processing methods is producing heretofore impossible-to-form space age hardware.

Marquardt's consistent break-throughs in the ultra-high temperature areas of refractory metals, gradated resistant coatings and metal reinforced ceramics provide customers with a proven record of materials engineering and processing progress.

At Marquardt, "materials" application does not lag behind design requirements. When design engineers demand fabrication or utilization of metals, alloys, and ceramics that will withstand the stresses, strains, and erosion of elevated temperatures, Marquardt provides not only the technical answers, but the products themselves.

Fifteen years technological experience gained in research, development and production of chemical and electrical power systems for atmospheric and space flight, are important benefits offered by Marquardt engineers. This leadership combined with extensive modern facilities, provide Department of Defense and Weapon Systems Managers with a unique capability for research, development and production of reliable high temperature materials and structures. Detailed information about Marquardt's experience, facilities and services may be obtained by writing Bill O'Connor, The Marquardt Corporation, 16555 Saticoy Street, Van Nuys, California.

Engineers and scientists experienced in these or related fields will find it rewarding to discuss their career futures with Marquardt. The company's growth is a parallel to the atmosphere of challenge and rewarding accomplishment that has existed since the firm's beginning.

SPIN FORGE (TOP) — Capable of exerting an accurately controlled million pounds working force, this Spin Forge cold-flow forms seamless components up to 5 feet in diameter and 15 feet long.

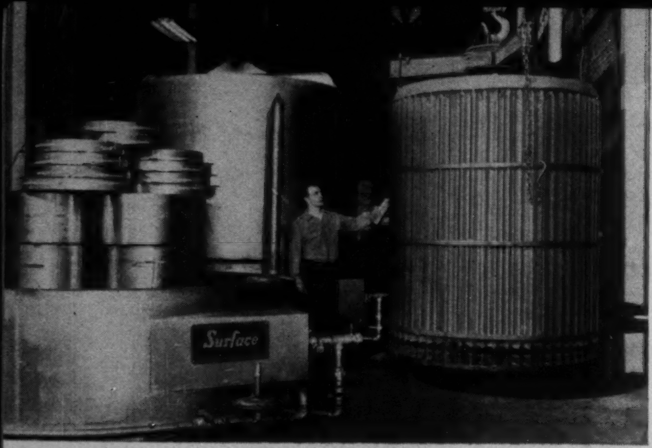
40 KW PLASMA JET (CENTER) — Temperatures up to 30,000°F generated by plasma flame may be used for applying ceramic, metal or cermet coatings.

TM-1 TEST MACHINE (BOTTOM) — The auto-dynamic elevated temperature testing machine conducts tensile, creep, stress-rupture, compression tests of metals at temperatures up to 3,500°F. Programming of mission load-temperature-time parameter may be performed.

THE Marquardt
CORPORATION
16555 SATICOY STREET, VAN NUYS, CALIFORNIA

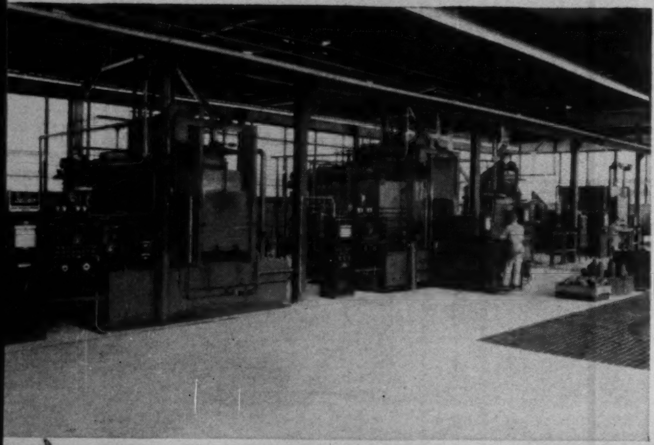
ASTRO ◆ COOPER DEVELOPMENT DIVISION
◆ OGDEN DIVISION ◆ POMONA DIVISION
◆ POWER SYSTEMS GROUP

CORPORATE OFFICES: VAN NUYS, CALIFORNIA

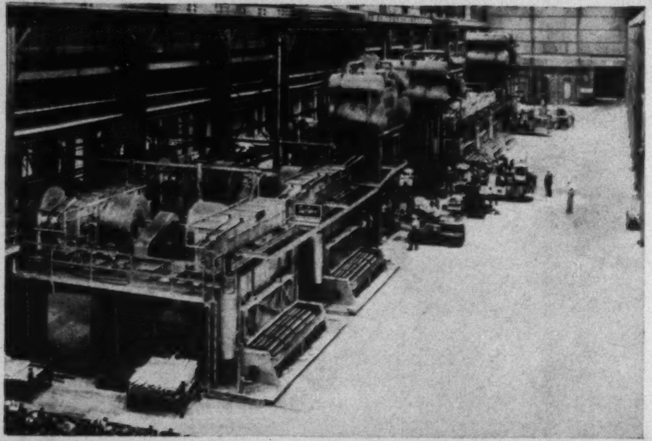


Cupro-nickel coils

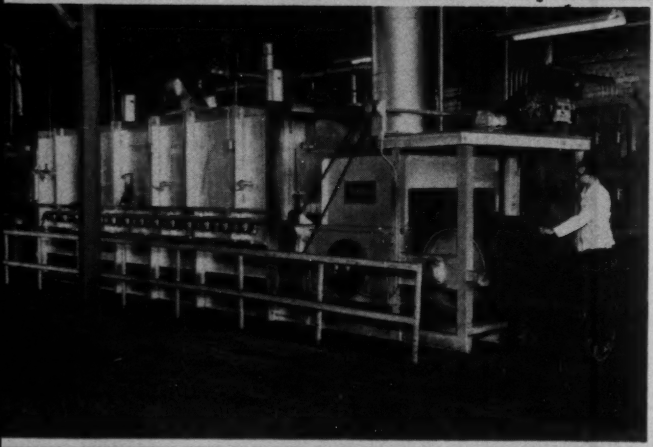
Aluminum coils



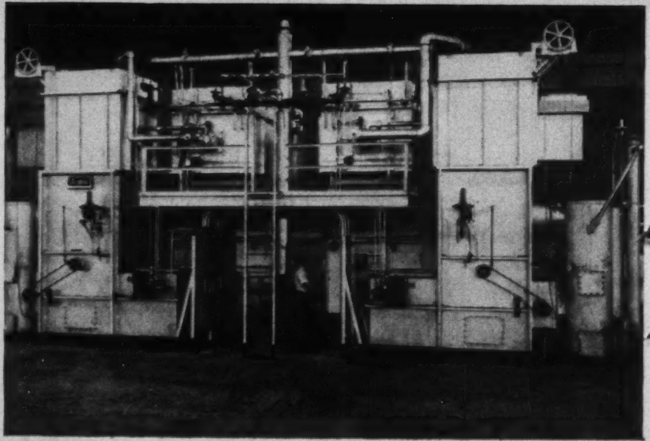
Steel gears and pinions



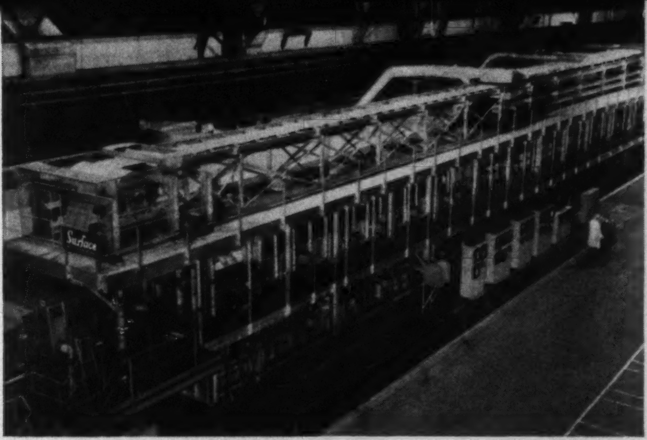
Aluminum billets



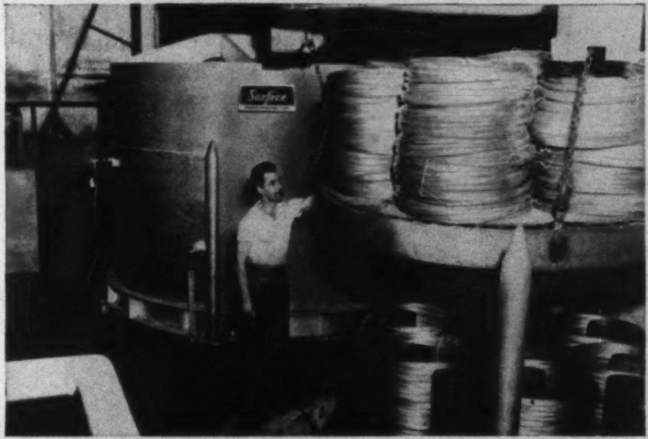
Automotive steel forgings



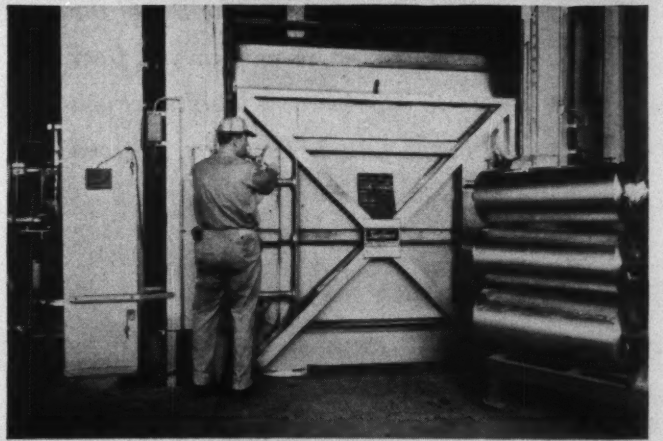
Brass tubing



Steel strip



Brass wire



Aluminum foil

See us at the Metal Show
Booth 1540

How Surface Power Convection* Equipment increases speed and uniformity of heat treatment

Rates of heat transfer by radiation are limited by maximum available "thermal heads," various shapes and heat absorption properties of work pieces, and control problems which become critical when rate of heat transfer is very high.

On the other hand, heat transfer by convection can take place at rates of extreme speed, with air temperature very close to the desired work piece temperature, assuming very high air velocities.

To get such high air speeds in the first place (with fans running close to the strength and temperature limits of the best alloys available) and then use the heated air effectively in heat treating are two major problems which Surface began to tackle years ago. Gradually Surface furnaces were designed more and more like wind tunnels.

So effective are Surface's new techniques in convective heat transfer, that we can now define a furnace in terms of its **convection power:** its ability to heat the work primarily by convection, with great speed, uniformity, and efficiency.

Some of the results are spectacular; all have brought about important cost savings or product improvement. We invite you to write for Bulletin SC-182 describing Surface Power Convection equipment in more detail. Surface Combustion, 2373 Dorr Street, Toledo 1, Ohio. In Canada: Surface Industrial Furnaces, Ltd., Toronto, Ont.

*Trademark of Surface Combustion, Division of Midland-Ross Corp.

A division of Midland-Ross Corporation

Surface

who cares about the freezing process . . . *as long as it tastes good? Many production men, understandably enough, share the viewpoint of this small-fry. It doesn't matter how steel freezes in the ingot mold, just as long as the bar and strip and wire and other shapes perform well. Other than steelmakers, who should care about uniform material? You should care if you've ever run into trouble with stainless or high temperature alloys or tool steels. For higher reject rates, premature part failure, shortened tool and die life, increased production costs, and dissatisfied customers . . . all can be traced directly to the ingot. An ingot of weak structure or poor composition can mean trouble in every piece of steel that comes from it.*

That's why we say the exclusive MEL-TROL® process goes a step beyond quality control. It includes a new patented mold which controls the freezing process . . . forces impurities to the top of the ingot where they can be cut off and discarded. This MEL-TROL ingot is more uniform . . . freer from segregation. You get clean, sound, tough metal from surface to core in every lot of steel you order. Specify Carpenter MEL-TROL steels and avoid trouble in the future. Then you, too, can enjoy the luxury of saying: "I don't care how they make it as long as it performs so well!"

Carpenter steel

you can do it ***consistently*** better with Carpenter specialty steels for specialists

Steel

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

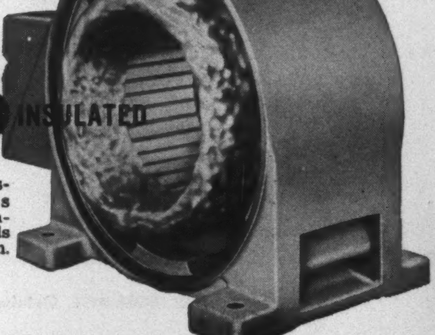
A complete line of integral HP motors: dripproof protected—totally enclosed—and explosion proof

ELLIOTT C-W MOTORS

conservatively designed, ruggedly built, highest quality throughout

The extra service users enjoy from Elliott C-W motors is due to the conservative design, precision manufacture and high-quality materials of these machines. For most applications, the dripproof-protected type gives dependable service. Where conditions are more severe the totally-enclosed or explosion-proof construction may be required. Recently added to the line are the EPA-SEAL epoxy insulated C-W motors for service where moisture or corrosive atmospheres demand superior insulation.

EPA-SEAL INSULATED



Vacuum-pressure process thoroughly impregnates coils with epoxy resin.

ELLIOTT Company
Crocker-Wheeler Plant
Jeannette, Penna.

WO-2

Initial Price...
Owning Cost?
Knowing both can keep your steel costs low

Steel is low in cost. If your *final* cost figure doesn't reflect that, then unnecessary, hidden expenses may be creeping into your operations. If you haven't done so, figure your costs of possession—like taxes and insurance, storing and handling. They may be adding to *your* steel costs. Often your steel service center can help you reduce them.

Each steel user's case is different. Ask your steel service center to help you determine the most economical way to buy steel. They will give you a helpful guide for figuring all your costs of possession, such as:

Cost of capital:	**Cost of operation:**	**Other costs:**
Inventory	Space	Obsolescence
Space	Material handling	Insurance
Equipment	Cutting & burning	Taxes
	Scrap & wastage	Accounting

Call your nearby steel service center, or write for free booklet, "What's Your Real Cost of Possession for Steel?"

STEEL SERVICE CENTER INSTITUTE

...YOUR STEEL SERVICE CENTER

STEEL SERVICE CENTER INSTITUTE
540-A Terminal Tower, Cleveland 13, Ohio

Steel

This coil-fed Wean "Flying Press" line performs both shearing and blanking operations.

Massey-Ferguson saves up to $9 per ton on material costs with Wean coil processing lines

As a measure of its products' popularity, Massey-Ferguson, Ltd. of Toronto cites the fact that M-F combine and baler production fills every available Canadian railroad flat car twice a year.

Five years ago, Massey-Ferguson's production and purchasing personnel made a thorough cost study of their extensive steel demands, then being provided by shearing from purchased sheets. As a result, three Wean coil processing lines were installed to supply these requirements directly from standard coil.

The three Wean lines are: (1) an edge-trim and cut-to-length line, with a flying shear; (2) a Wean slitting line; and (3) a Wean "Flying Press" line that offers the versatility of straight or angle shearing or blanking of coil stock, all in one machine.

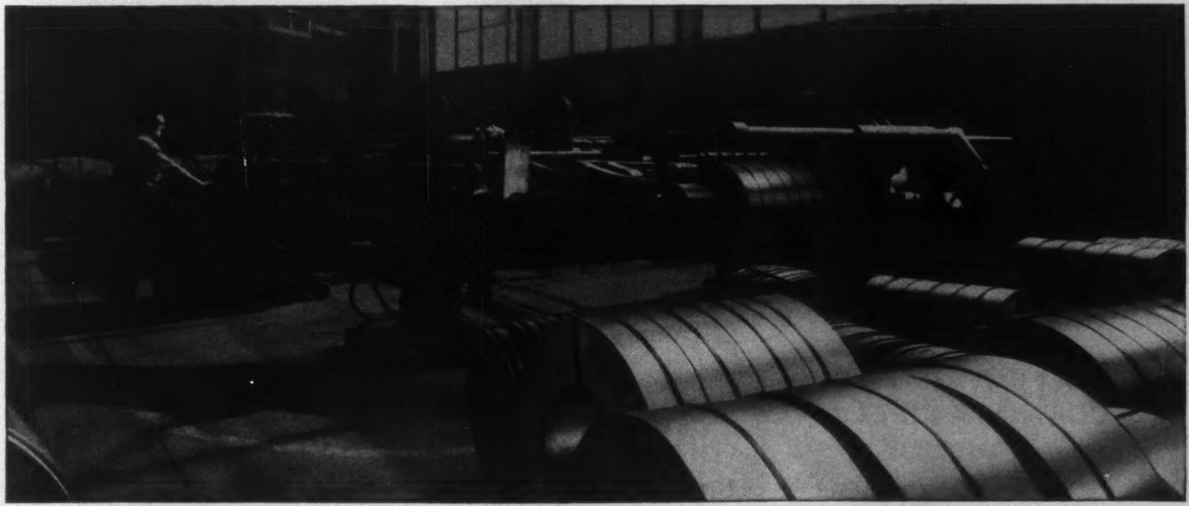
Massey-Ferguson management credits this coil processing system with savings of from $4-9 per ton of metal consumed. And besides the direct production savings in sheet supply, the threat of model-change obsolescence is removed when steel inventory is in coil form.

Many metalworking firms have had similar experience in the profit-making aspects of coil processing equipment. The concept and economics of coil processing are discussed in a new brochure available from Wean. Write for your copy of this informative catalog.

WEAN EQUIPMENT CORPORATION
22800 Lakeland Boulevard
CLEVELAND 17, OHIO

WEAN

Standard coils are slit to a wide variety of widths on this Wean line at the Toronto M-F plant.

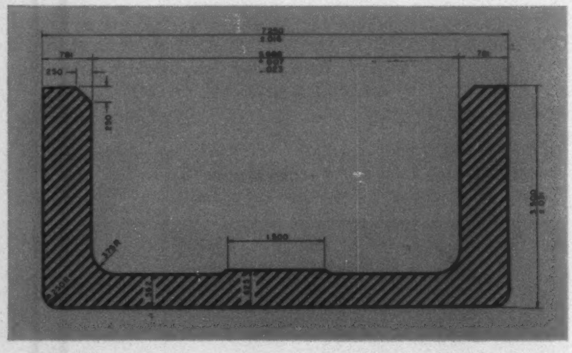


CONNORS special sections at Towmotor...

TOWMOTOR
TOWMOTOR
TOWMOTOR
TOW

"We increased our production efficiency 25% with Connors Special Sections," says Mr. Richard S. Wentz, Vice President, Towmotor Corporation

"By working with Connors Special Sections Engineers, we have gone a long way in improvements in product design and styling," Mr. Wentz says. "The flexibility of the Connors mill has enabled our engineers to design sections which in the past were considered impractical from a mill standpoint, yet highly desirable to our engineering and production departments."



Towmotor had been machining the height, the inside face and the 45 degree chamfer on their mast channel section. These operations were eliminated by a special section rolled by Connors providing the dimensions required as well as other desirable features.

Let Connors Special Sections work for you.

For illustrated brochure or consultation write or call Connors — Specialists in Special Sections
CONNORS STEEL DIVISION, P. O. BOX 118A, HUNTINGTON, WEST VIRGINIA • PHONE JAckson 9-7171

CONNORS STEEL DIVISION **PORTER** ***H.K. PORTER COMPANY, INC.***

PORTER SERVES INDUSTRY with steel, rubber and friction products, asbestos textiles, high voltage electrical equipment, electrical wire and cable, wiring systems, motors, fans, blowers, specialty alloys, paints, refractories, tools, forgings and pipe fittings, roll formings and stampings, wire rope and strand.

Your most valuable dollars may be life insurance dollars

LIBERTY
IN GOD WE TRUST
19

The dollar value of your estate is not only important to you *now* but to your family in the *future.* Failure to make proper provisions beforehand is costly. The unavoidable expense of taxes, debts, administration and legal fees can shrink the value of an estate by a third or more — money paid to strangers rather than heirs!

But an Ætna Life Estate Conservation Plan pinpoints ways to cut tax liability and settlement costs to the minimum. Then it provides adequate cash to cover the unavoidable costs . . . *valuable dollars* that guarantee your heirs all that you intend them to have.

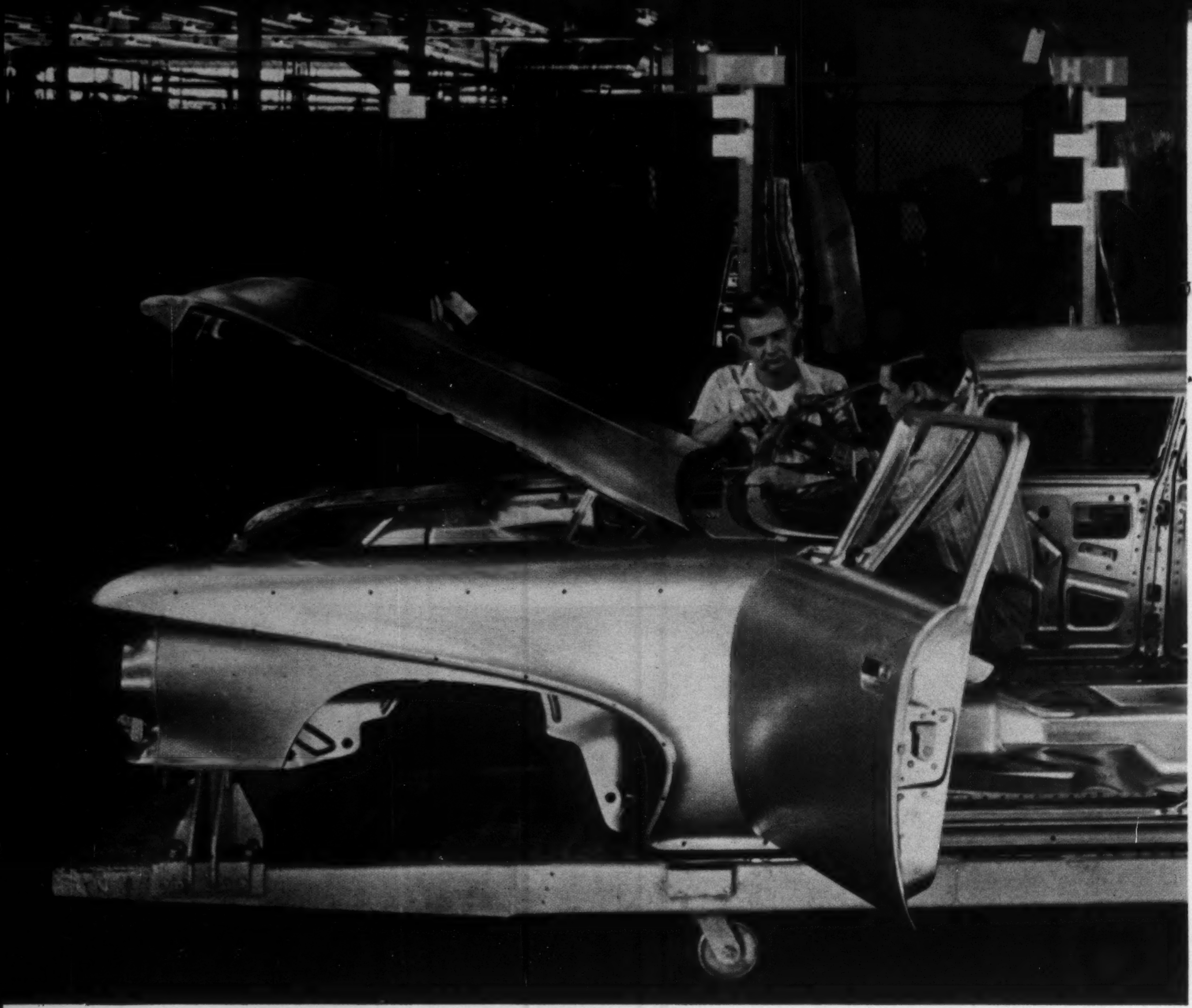
An Ætna Life representative, working through your attorney, will gladly review your present arrangements — or establish a plan if you have none — without obligation through your Ætna Life office.

Ætna Life's Estate Analysis works for you and your family

- **Minimizes tax liability**
- **Provides money to pay transfer costs**
- **Assures orderly transfer to heirs**
- **Protects against forced sale or borrowing against estate assets**

ÆTNA LIFE
INSURANCE COMPANY
Hartford 15, Connecticut

Affiliates: Ætna Casualty and Surety Company
Standard Fire Insurance Company



Much of the beauty of Chrysler cars

The proper foundation of a Chrysler-style paint job shows itself in this gleaming Plymouth "body-in-white"—steel with the surface finish a truly fine car must have.

Body parts for Chrysler cars emerge from a complex of huge presses and coils and sheets of flat rolled steel. Floor pans are formed, to be wed further on into single unitized assemblies of 50 major parts by fully-automated resistance welders. Doors are stamped with great precision, and 100 ton presses squeeze out car roofs, without a break or blemish. This is Chrysler Corporation's Ohio Stamping Plant, giant of the auto industry, where 28 major stamping lines eat 2000 tons of steel a day and produce 600 different body parts. Steel is the basic raw material of this amazing plant—and the men who buy and use it know exactly what they need. As a regular supplier, J&L matches their needs *consistently.*

J&L STEEL

Jones & Laughlin Steel Corporation

3 GATEWAY CENTER, PITTSBURGH 30, PA.

Steel

Feast your eyes on over 1000 lbs. of unadorned steel! Notice how the steel itself contributes to the elegance and grace of Chrysler styling—how, even in this raw metal stage, the "body-in-white" has a lustrous finish of real beauty.

comes from the steel itself

Each die-forming situation is individual and demands a specific set of metallurgical properties from the steel. In many cases, the factor of extreme importance is surface finish of the steel. Other times, drawing quality is paramount. And often, *combinations* of these and other qualities are needed, balanced one against the other with metallurgical precision.

The Ohio Stamping Plant may be big. But it is a tight operation—efficient, competitive, economical, with full control of quality at all times to insure the beauty and soundness of Chrysler bodies. That J&L steel is bought regularly, and used at one time or another in all the major parts produced by the Ohio Stamping Plant, speaks well indeed for J&L quality.

◄

This Steelmark identifies products made of steel. Look for it when you buy.

This is the roof line—at full rate of production. J&L is one of only three suppliers who can provide the 80-inch, 0.038-gage coils Chrysler needs here. Breaks and strain lines cannot be tolerated on roofs, so drawing quality is vital—as is surface finish, for reasons of appearance.

Intense heat from four Gas-fired torches skin dries pipe molds in as little as 2 minutes, after ramming and facing with a blacking material.

Only GAS provides the clean, uniform heat needed to skin dry pipe molds! Millions of BTU's of clean, uniform heat are required every hour by Warren Foundry & Pipe Division of Shahmoon Industries, Inc., Everett, Massachusetts, to skin dry its pipe molds.

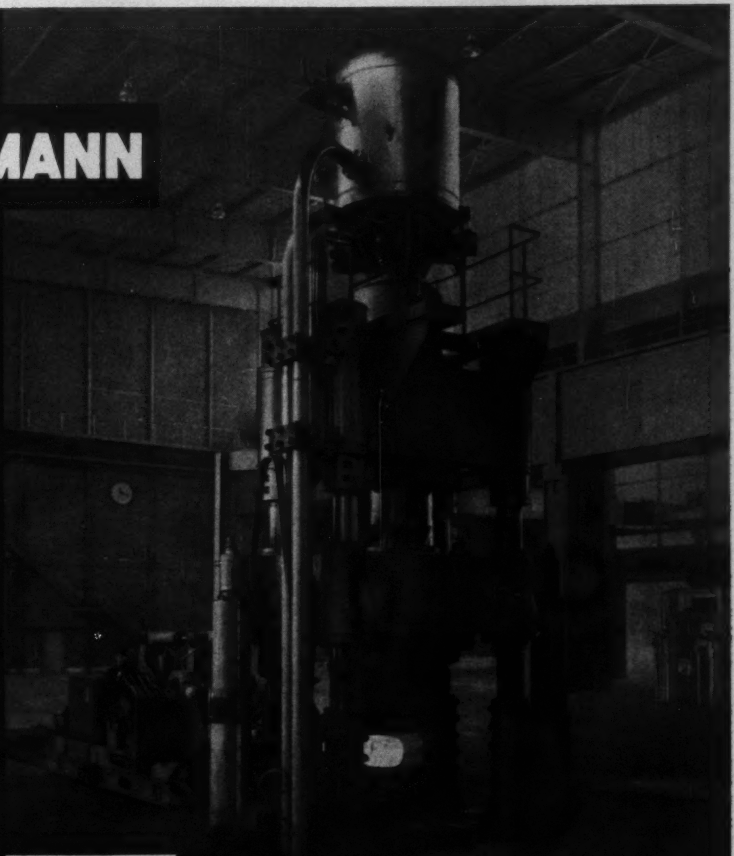
Only Gas provides this volume of heat without any problems of shipping and storage. That's why Warren Foundry chose Gas to solve this large scale heating problem. And as plant engineer William Mitchell says, "We chose Gas over other fuels because of its cleanliness and uniformity of heat value."

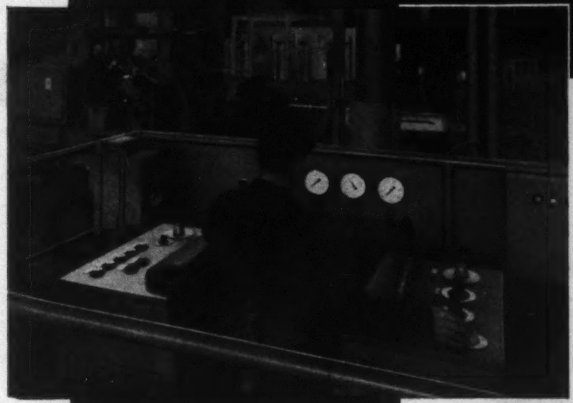
For information on how Gas can help you with your production problems, call your Gas Company's Industrial Sales Engineer. He'll be glad to discuss with you the economies and outstanding results you get with the clean, uniform heat of Gas, and modern Gas-fired industrial equipment. **AMERICAN GAS ASSOCIATION**

FOR CONTROLLED INDUSTRIAL HEATING

. . . GAS IS GOOD BUSINESS!

SCHLOEMANN





1000-ton High Speed Forging Press of welded construction engaged on automatic planishing. It is also suitable for bending, forging, flattening and levelling duties.

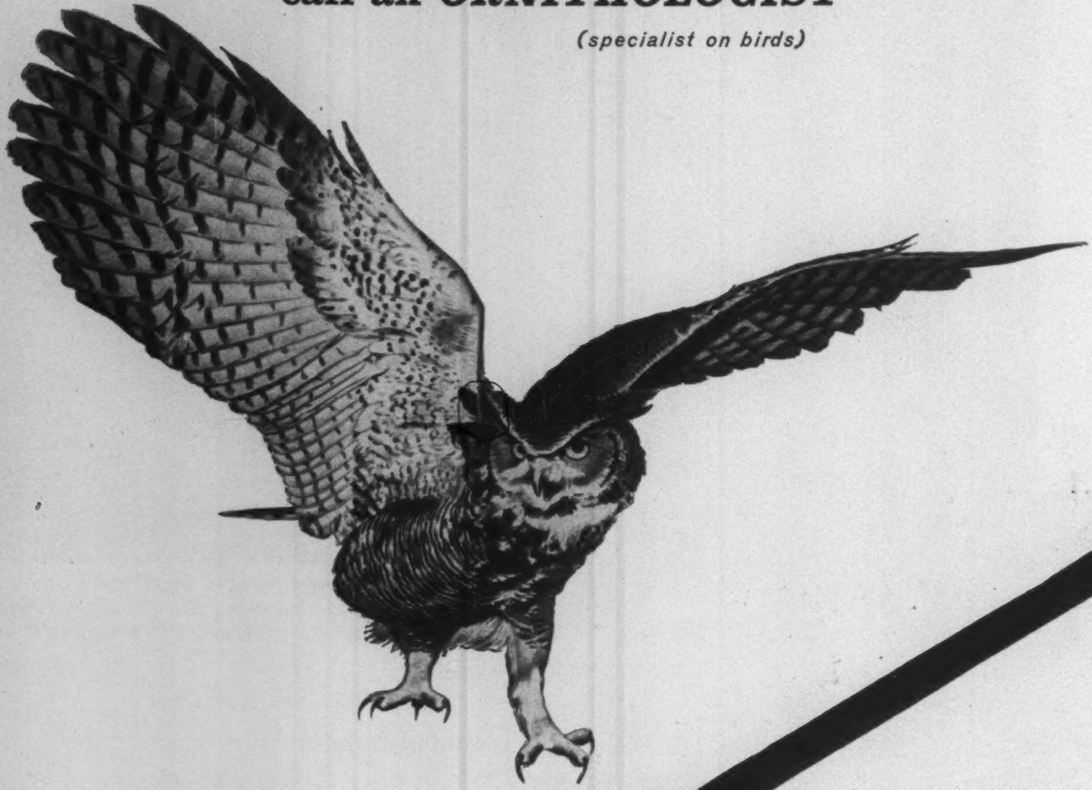
Economic forging

Rigidity combined with ruggedness make for low stresses in the crossheads and columns • Electrically operated oil-hydraulic control system and automatic planishing stroke device with adjustments for length and number of strokes and operating level reduce pressure water consumption and provide for ready adaptability to the requirements of the forging programme • Sensitive control and large number of strokes result in higher forging precision, reducing machining costs and increasing output.

FELLER ENGINEERING COMPANY 1190 Empire Building, Pittsburgh 22, Pa.

For tips on finding the Great Horned Owl... call an *ORNITHOLOGIST*

(specialist on birds)



for tips on welding stop-and-go jobs... call in *LINCOLN*

(specialists in arc welding)

A KANSAS MANUFACTURER OF MOBILE HOMES doubled the welding speed on his undercarriages by simply changing electrodes—and in addition, saved over $8000 in the first year.

Manufacturing cost on undercarriage fabrication was prohibitive. Thirteen gauge cross members were welded to twelve gauge channels by welds made in both vertical and flat positions. These short welds on steel having some scale and oil slowed down production.

Finally they called in their LINCOLN Field Engineer. Painstaking tests, made by the LINCOLN man with the welding foreman and plant superintendent, proved LINCOLN's Fleetweld 37 electrodes far better for this application.

RESULTS: lower costs . . . welding speed doubled . . . cleaning time cut in half.

That's why we say it's a good idea to do business with LINCOLN where arc welding is a specialty and cost reduction comes to you as a "plus" at no charge.

THE LINCOLN ELECTRIC COMPANY
Dept. 1940 • Cleveland 17, Ohio

LINCOLN
WELDERS

Another good customer is assured

PREDICTABLE PERFORMANCE

with a SECO 60" SLITTING LINE

This "custom-built" SECO 60" Slitting Line, recently installed in a midwestern steel company's plant, was designed and built to their exact specifications to provide maximum performance.

Features of this custom-built SECO Slitting Line are:

- Coil weight capacity—40,000 lbs
- 225 fpm line speed with build-up to 735 fpm
- .1875 max. material thickness—5 cuts
- .020 min. material thickness—20 to 30 cuts
- Line arranged to handle sheets or coils
- Power driven hold-down rolls for uncoiling heavy gauge material
- Peeler and Straightener at uncoiler minimizes manual handling
- Variable speed D.C. drive
- Control equipment at operator's desk
- Over-arm separator at recoiler
- Removable housing assembly for quick knife changeover away from slitter

Whatever your requirements, SECO can provide a complete range of Slitting Lines—from 12" to maximum strip widths—as well as other Steel Mill equipment. SECO's staff of trained sales engineers are at your service to assist you with any production problem you may have. Call or write today.

SECO

SECO STEEL MILL EQUIPMENT

- Leveling and Shearing Lines
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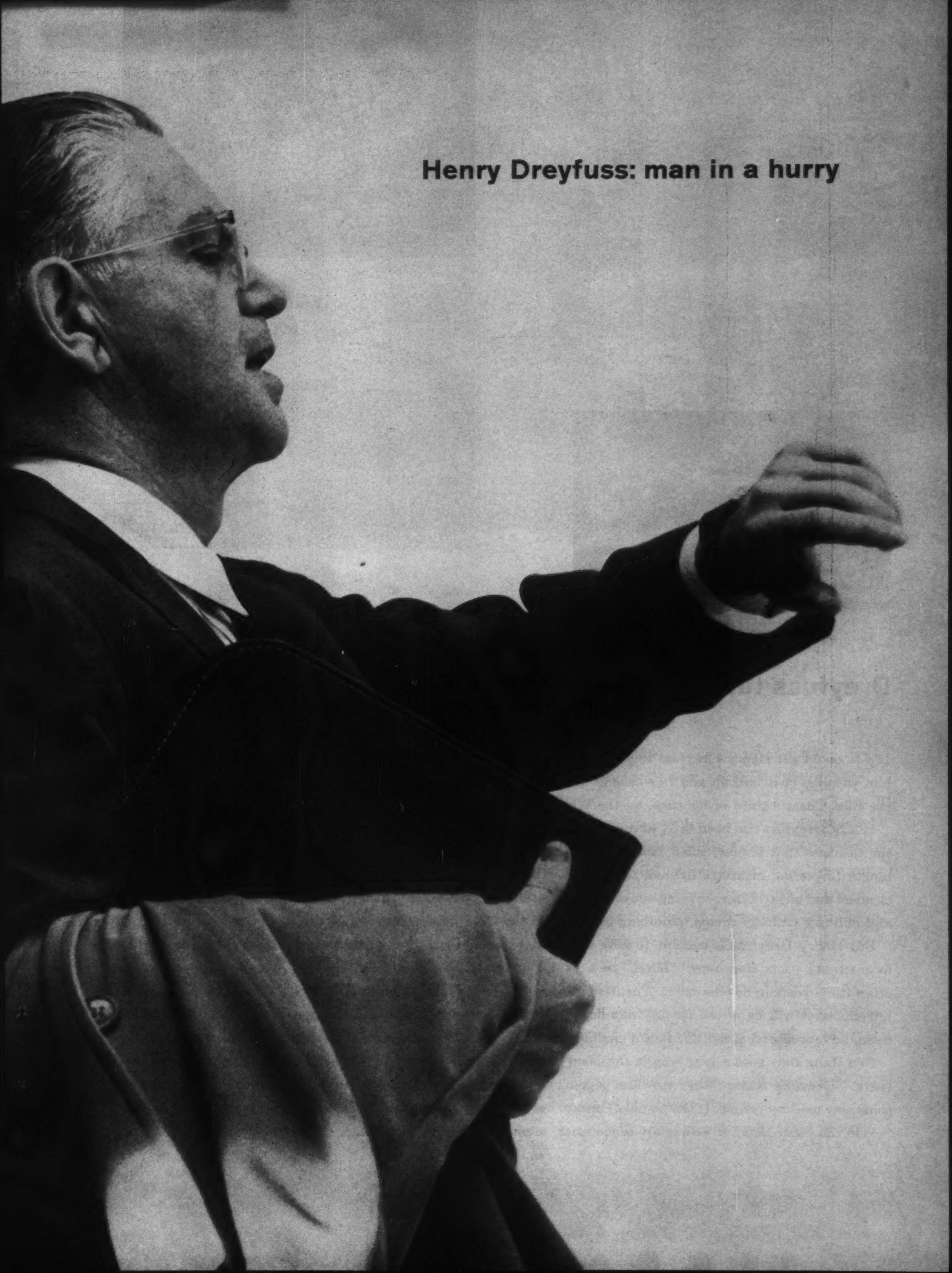
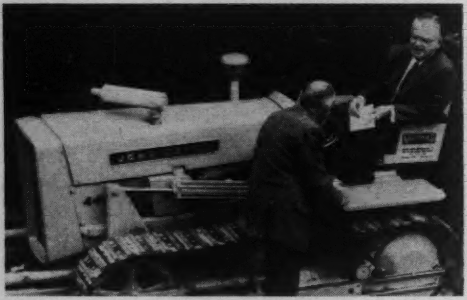
Henry Dreyfuss: man in a hurry





Dreyfuss talks design

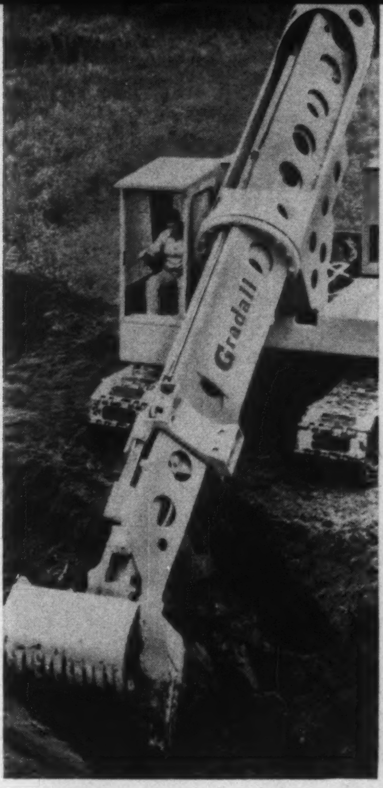
If you could get Henry Dreyfuss to sit still long enough for a caricature, the drawing would inevitably show him with his coat half on and briefcase in hand. Most likely, he would be on his way to the airport. He's on the East Coast a third of his time, on the West Coast a third, and the other third in between.

Henry Dreyfuss has been busy ever since he gave up scenery design in the late Twenties and helped pioneer the business that is now called industrial design. In the early days, he gave a new look to everything from hinges to pianos, cigarette lighters to tractors. Today he can look back on a career of redesigning vacuum cleaners and gas stations, bowling alleys and ship interiors, typewriters and dental equipment, magazine formats and military strategy rooms, plumbing fixtures and the Nike missile launcher.

But Henry Dreyfuss is not one to look back. There are designs on his boards today that will influence our lives twenty years from now. "Time," he says, "is one of the designer's big problems. A design assignment is often three years in development. The item may not be on the market for another three to ten years. After it's introduced it will be in use for any number of years. In order to design that far ahead, our ideas have to be fresh, advanced and sprightly. It is a challenge to have to think as far ahead as we do."

One thing that goes a long way is the Henry Dreyfuss design credo, and it is all about people. "It says in effect," Dreyfuss states, "that the item is going to be ridden in, sat on, looked at, talked into, operated or in some way used by people. If the point of contact between the product and people causes friction, we have failed.

"On the other hand, if people are made safer, more comfortable, more eager to purchase, more efficient, or



just plain happier—we have succeeded." And succeed Dreyfuss does, by following this yardstick for effective industrial design: 1. Safety and convenience of use. 2. Ease of maintenance. 3. Cost, including tooling, production and distribution. 4. Sales appeal. 5. Appearance.

Selection of the right material for the job plays an important role in satisfying each of the five requirements. As a matter of ethics and sheer common sense, Henry Dreyfuss, like any member of the American Society of Industrial Designers, will not endorse any one material. "We have worked with all materials. What we want is the material that is right for the job. We look for the material that combines reasonable cost with the ability to be fabricated economically, and at the same time will give the product the built-in quality and durability it needs to sell well." With no-nonsense requirements like that, it is not surprising that a great many Dreyfuss-designed products use steel in one way or another.

Steel has strength, integrity and honesty. Steel is what the designer is apt to call a 'natural.' Dreyfuss feels that the public's image of steel depends largely on the product itself. A massive steel vault door conjures up an image of strength, imperviousness. Stainless Steel tableware suggests style and modernity. Steel curtain wall panels give buildings the look of tomorrow.

The moral is this: steel has been with us for ages, yet it is the modern metal, the metal of the future. Its enduring modernity will continue to be recognized, and used, by designers like Henry Dreyfuss.

(turn the page for a new look at steel)

United States Steel

TRADEMARK

designing with USS High Strength Steels

Good design goes beyond material selection. Once the choice has been made, the designer's job is to take full advantage of the material's properties. Few materials offer designers as much opportunity as high strength steels.

COR-TEN Steel was developed by U.S. Steel and first used in 1933.

Dead weight in stationary structures is costly; in mobile equipment dead weight requires more power to move.

USS Cor-Ten Steel is a name that has become a byword in design circles. It is a time-tested, high strength low-alloy steel. Structural designers welcomed Cor-Ten Steel because it allowed them to pare dead weight and to lower maintenance costs. As structures, mobile equipment and machinery got bigger and bigger, dead weight became more of a problem. Even when weight could be shaved without stress problems, durability suffered. This high strength steel answered both problems.

USS High Strength Steels' yield points are all 50,000 psi min. compared to 33,000 psi for structural carbon steel.

Strength did it. Cor-Ten brand and other USS High Strength Steels have a 50% higher yield point than structural carbon steel. They permit as much as 33% weight reduction. They have superior resistance to atmospheric corrosion and abrasion, so there is little reason to over-design. Their fatigue and impact properties are excellent. Here is a quick look at three well-known USS High Strength Steels:

Send for the manual described at the right for a comprehensive guide on how to design with high strength steels.

USS Cor-Ten Steel has a yield point 50% greater than structural carbon steel, has four to six times its resistance to atmospheric corrosion. It is used to do any one of these three things: 1) in slimmer sections to cut weight at no strength loss; 2) in equal sections to increase load-carrying capacity, cut maintenance and lengthen life; and 3) any number of combinations of 1 and 2. Cor-Ten Steel also has greatly superior paint adherence and is used where a longer interval between repainting is wanted.

USS Tri-Ten Steel, with its 50% higher yield point than structural carbon steel, has superior notch toughness at low temperatures and keeps rugged equipment operating even in sub-zero weather. Its high endurance limit makes Tri-Ten Steel ideal for mobile equipment that must take repeated loading and reversals of stress. It is a natural for welded structures and bridges.

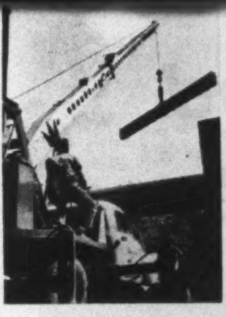
MAN-TEN Steel costs only about 20% more than structural carbon steel; TRI-TEN Steel about 36% more, and COR-TEN Steel 42% more.

USS Man-Ten Steel also has a 50% higher yield point than structural carbon steel, and is the low-cost member of the family. Weight reduction as little as 17% with Man-Ten Steel will save money on material cost alone. Man-Ten Steel is a tough, durable steel and widely used in earthmoving equipment, truck frames, material handling apparatus and riveted bridges.

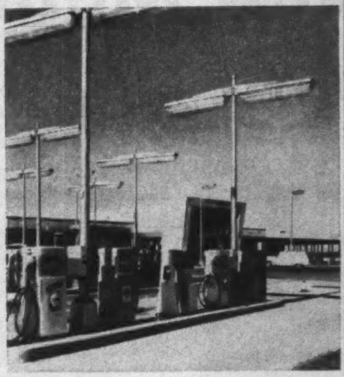
High strength steels represent but a few of the over 3000 grades of steel in existence today. United States Steel makes a complete line of high strength steels, as well as constructional alloy, stainless and carbon steels. Bring your design problems to us. United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS, COR-TEN, MAN-TEN and TRI-TEN are registered trademarks.

USS United States Steel



Cranes have to operate in all-weather temperatures and are subject to stress and shock. That's why many of them are made of tough TRI-TEN Steel.



Light standards stay good looking for years because of COR-TEN Steel's outstanding atmospheric corrosion resistance. Paint life is extended. Slim design is made possible by COR-TEN Steel's strength.

TRI-TEN Steel has cut weight and cost of dozens of major bridges. In the bridge shown here, TRI-TEN Steel saved a quarter of a million dollars.

One of the first applications of COR-TEN Steel was in hopper cars for weight reduction and longer life. Today, use of COR-TEN Steel can save hundreds of dollars over the life of a car.

MAN-TEN Steel, used in truck frames and body members, reduces dead weight and increases payload.

The LPG cylinder business uses considerable amounts of MAN-TEN Steel because of its strength, cost and ease of fabrication to lighten the weight.

This mark tells you a product is made of modern, dependable Steel.

Here's a book that is in the hands of thousands of engineers and designers. It is your guide to the design of lighter, stronger equipment and structures.

design manual for high strength steels

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Please send me "Design Manual for High Strength Steels"

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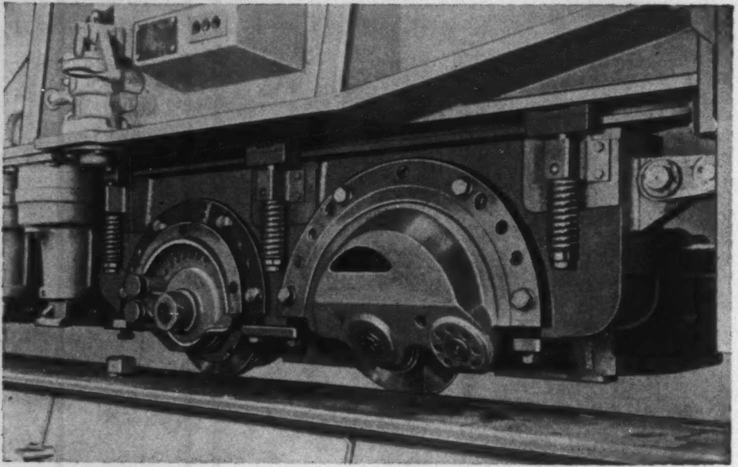
A Completely New Method Of Heavy Duty Shearing

by

SCHULZE & NAUMANN

Roller Shears



Close-up of carriage with shearing rollers for straight and bevel cut

Schulze and Naumann Roller Shears bring you an entirely new concept of heavy duty shearing—providing tremendous improvements in accuracy, quality of cut, speed and economy over older, flame cutting methods. Most models can even be built as combined shear and plate edge planers.

Shearing Principle. Plates are sheared between a lower knife and an upper roller shear. A powerfully driven carriage carries two shearing heads, one for straight and one for bevel cuts.

Strip Cutting. Positive "hold-downs" permit strip to be cut free of camber, twist or bow on the S&N double bed shears.

Planing. Powerful planing equipment can be added to produce, for example, double vees or profiled edges. Planing capacity can be much larger than shearing capacity.

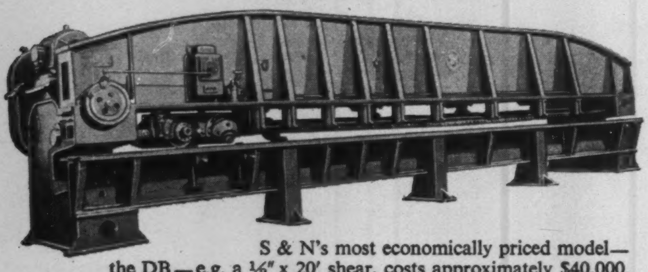
Capacity. Plates from ¼" x 20' to 1½" x 55', or even larger, are sheared in one setting.

Accuracy. Extremely rigid design and powerful, positive hold-downs guarantee cuts of unequalled accuracy and quality.

Speed. Shearing speeds up to 112 feet per minute are possible. An S&N Shear will cut a greater total length in one day than any other method.

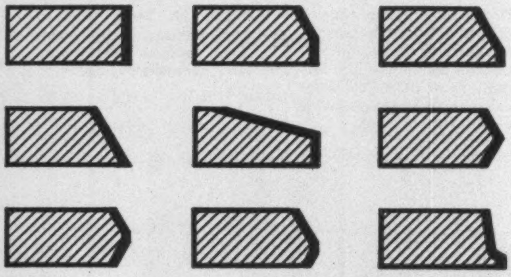
Versatility. Any type of edge preparation is possible, including straight, beveled or combined cuts.

Five different models to suit your needs.



S & N's most economically priced model—the DB—e.g. a ½" x 20' shear, costs approximately $40,000.

EDGES PRODUCED ON S & N ROLLER SHEARS



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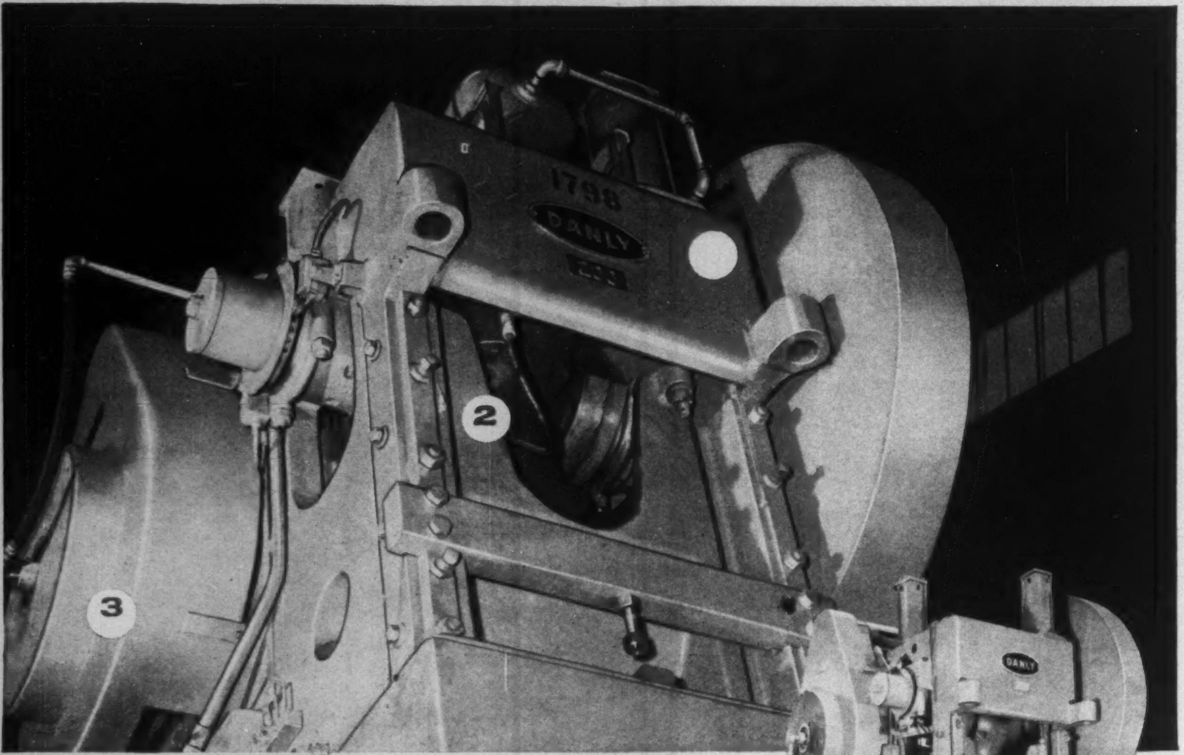

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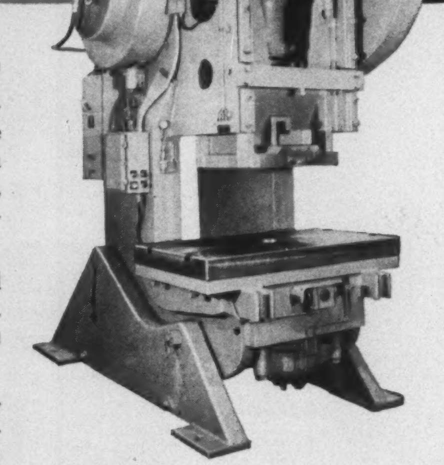
③ **Compare the clutch . . .** the same patented air friction clutch that has made Danly presses standouts in major stamping plants around the world. Because of its low inertia design, and long-life floating friction inserts, your maintenance department can almost forget it's there.

Compare a Danly O.B.I. from *any* angle. You'll find it's built for lower cost, more dependable operation. Write for the new Danly O.B.I. Catalog and the detailed specifications will convince you.



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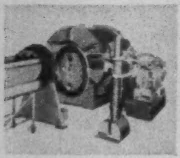
Lindberg's exhibit at the ASM Show will have something of interest to anyone concerned with the application of heat to industry

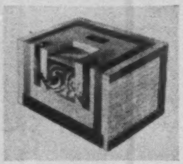
Whatever your interest in industrial heating processes or equipment, we've carefully assembled material for our ASM Show exhibit to make sure that there will be something interesting enough to make your visit well worth while. Since Lindberg covers the entire field of "heat for industry" you can count on our coming up with helpfully informative ideas on all angles of this important phase of industry. If you are an old friend of ours we'll be happy to welcome you again. If you don't know all about Lindberg please come in and get acquainted. Here is a preview of some of the things we will be able to show and explain when you drop in:

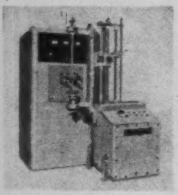

VACUUM HEAT TREATING FURNANCE

For example, you'll get information on vacuum heat treating, a complete picture of all types of vacuum heat treating furnaces and the advantages and specific uses of each. We know you'll be glad to be fully informed on this important method of metal treatment.

You will also be able to see and hear about the interesting developments we are making in the application of the new radiant wall heating principle to industrial heating equipment.

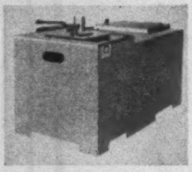
You will be interested, too, in a new development in Lindberg-Upton Salt Bath Furnaces. We call this the Cross-Channel Furnace, an entirely new concept of salt bath heating. This new type furnace provides a number of advantages: bottom heating; better salt circulation; inexpensive replaceable electrodes; long liner life; higher voltages; lowest salt absorption.


CROSS-CHANNEL SALT BATH FURNACE

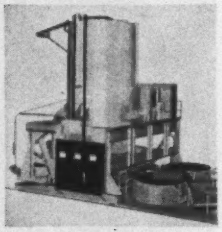

HIGH FREQUENCY UNIT AND ZONE SCANNER

If you have not been aware of the developments Lindberg is making in equipment for the important semiconductor field, we will be able to bring you up to date at the exhibit. We will have there our newly developed horizontal zone refiner for purifying metallic germanium and full information on all our zone scanning equipment. You can learn about our gaseous and solid diffusion furnaces for basic research, pilot plant work or production of solid state devices. On display we'll also have a new conveyor type pilot plant furnace, ideal for small production heat treatment of metals and for alloying transistors and magnetic metals for the electronic industry.

One of the most interesting developments we will have on display at the show is a new idea in two-chamber induction aluminum melting and holding furnaces. This features a removable inductor section which will drastically reduce furnace down time when channel replacement is required. With this new development maintenance costs are also satisfyingly minimized as the need for complete furnace relining is greatly reduced.


TWO-CHAMBER MELTING AND HOLDING FURNACE

Possibly you are not familiar with the remarkable progress Lindberg Industrial Division has made in field erected installations. We will be pleased to show you many important complete installations of all types of industrial heating equipment and facilities where design, engineering and construction have all been handled entirely by Lindberg. Lindberg Industrial projects have covered all phases of plant design and construction, complete plants, production lines, integrated and automated equipment.


FIELD-INSTALLED GANTRY TYPE FURNACE AND FACILITIES

Anticipating your visit we will have a full representation of our top engineers and technicians on hand so you will be able to get full information on all of our new developments and also have an opportunity to discuss any of your specific problems with some of our experts. Please remember, too, that if you aren't able to see us at the show, you can always get help from Lindberg for your industrial heating requirements by getting in touch with your local Lindberg Field Representative (see your classified phone book) or by writing us direct. Lindberg Engineering Company, 2452 West Hubbard Street, Chicago 12, Illinois.

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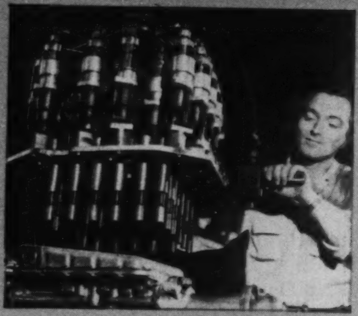

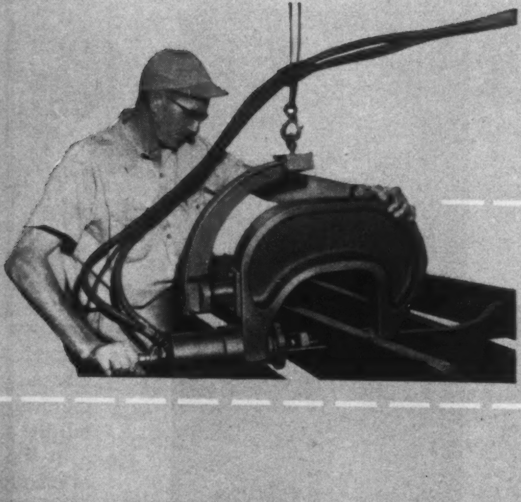

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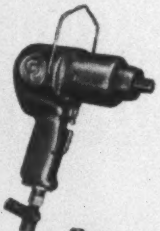
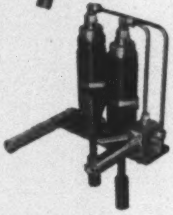
Air and electric models with conventional or "one-shot" torque control clutches—reversible or non-reversible—selection of handle styles—for threaded fasteners from #4 to 5/8" diameter.



IMPACT WRENCHES

Air and electric models with conventional and torque control clutches—reversible—selection of handle styles—for threaded fasteners from 1/4" to 3/4" diameter.



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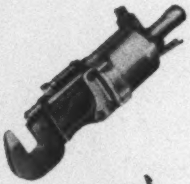
Air-operated units custom designed for simultaneous installation of two or more threaded fasteners—with direct drive or "one-shot" torque control clutch—for fasteners from #4 to 3/4" diameter.



COMPRESSION RIVETERS

Air, hydraulic and air-powered hydraulic models—portable or stationary—for ferrous or non-ferrous, solid or tubular rivets from 1/16" to 1 1/4" diameter.

NAIL DRIVERS

Air-operated models for 4 penny to 60 penny straight or threaded shank nails.

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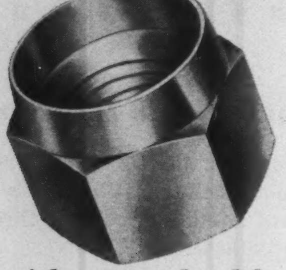
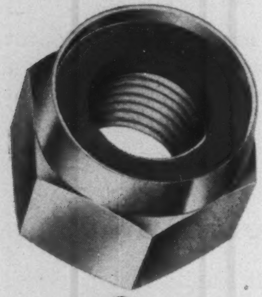
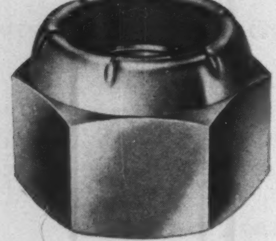
UNSHAKEABLE SELF-LOCKING PERFORMANCE IS BUILT INTO AN ELASTIC STOP NUT



Start with a standard hex nut and add a metal crown . . .



Add "the ring O of reliability"— the easily identified ESNA red nylon locking insert . . .



Then roll the crown over smoothly and stake— the insert is made an integral part of the Elastic Stop nut

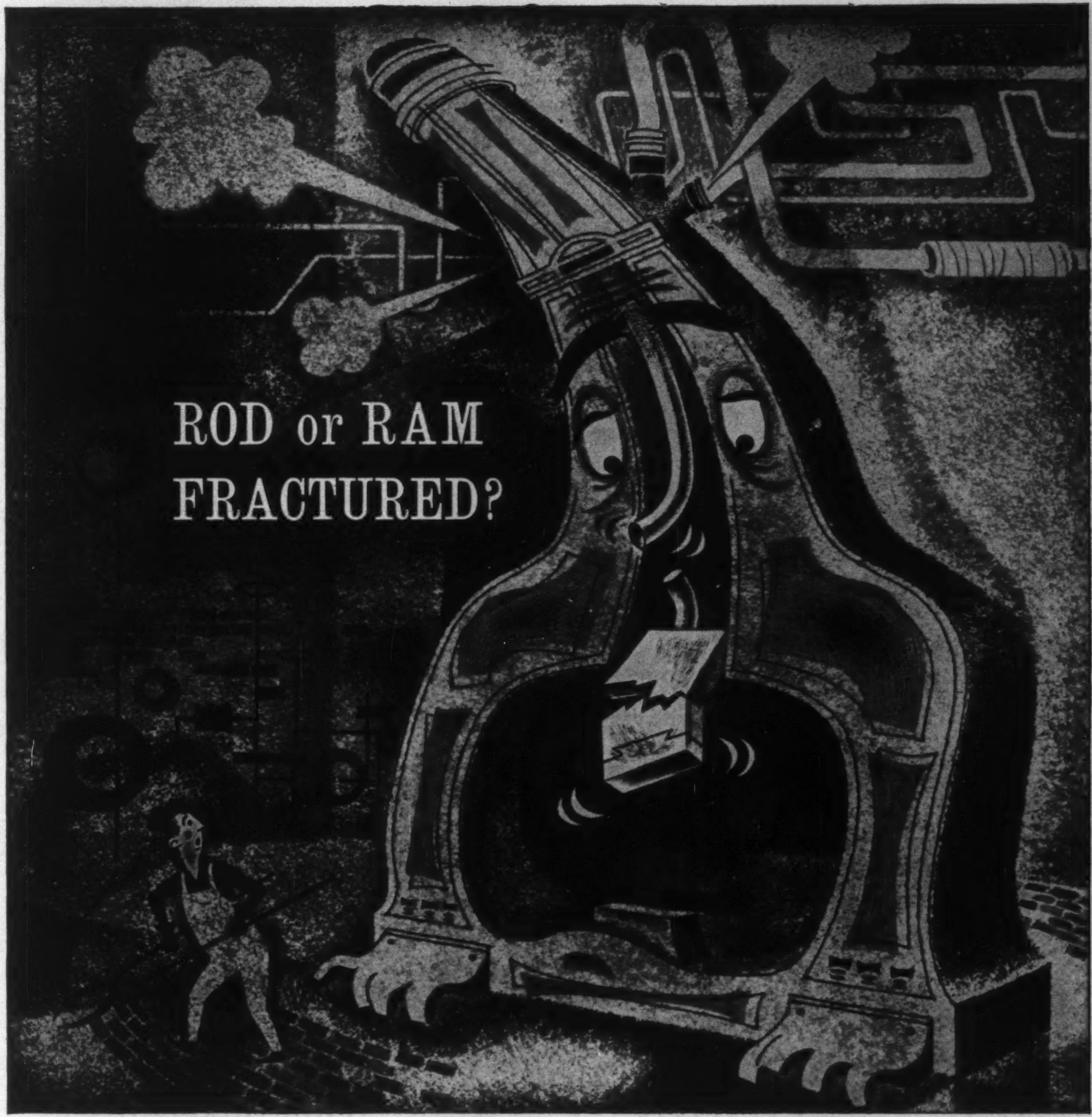
BUILD FASTENER RELIABILITY INTO YOUR PRODUCT!

Take an Elastic Stop nut and mount it on one of your products where vibration is really severe. Shake the daylights out of it in the roughest torture test you can devise—or better still—send it into the field where it's subject to regular use and abuse.

Here's what you'll find: That Elastic Stop nut will stay put! The bolt threads are impressed into the nylon locking collar with such a perfect fit that internal liquid seepage is sealed off. Internal nut and bolt threads are protected against corrosion. The nylon insert locking torque is so smooth that it never galls or distorts bolt threads; and nylon is so wear-resistant that under normal usage *you can wrench the nut on and off the bolt 50 times or more* and the nut will still remain tight under vibration! Protect the performance and the reputation of your product by guaranteeing fastener reliability. Try it yourself and see. Send for free test samples. Just tell us the size. Dept. S53-1077, Elastic Stop Nut Corporation of America, 2330 Vauxhall Road, Union, New Jersey.

ESNA

ELASTIC STOP NUT CORPORATION OF AMERICA



Call ERIE FOUNDRY for forging hammer replacement parts to your specifications

Replacement rods and rams, and many other parts for a wide variety of forging hammers of most any make are available from Erie Foundry. They are high in quality, competitive in price.

For over 65 years Erie Foundry has specialized in the design, development and manufacture of forging hammers of all types. Logically, then, Erie Foundry is a sure source for repair parts equal in quality and performance to the original equipment. Substantial inventories assure you of prompt service.

For more information on repair parts or our complete Rebuilding Service, write Mr. James Walker.

Manufacturers of Forging Hammers • Forging Presses • Hydraulic Presses • Trimming Presses

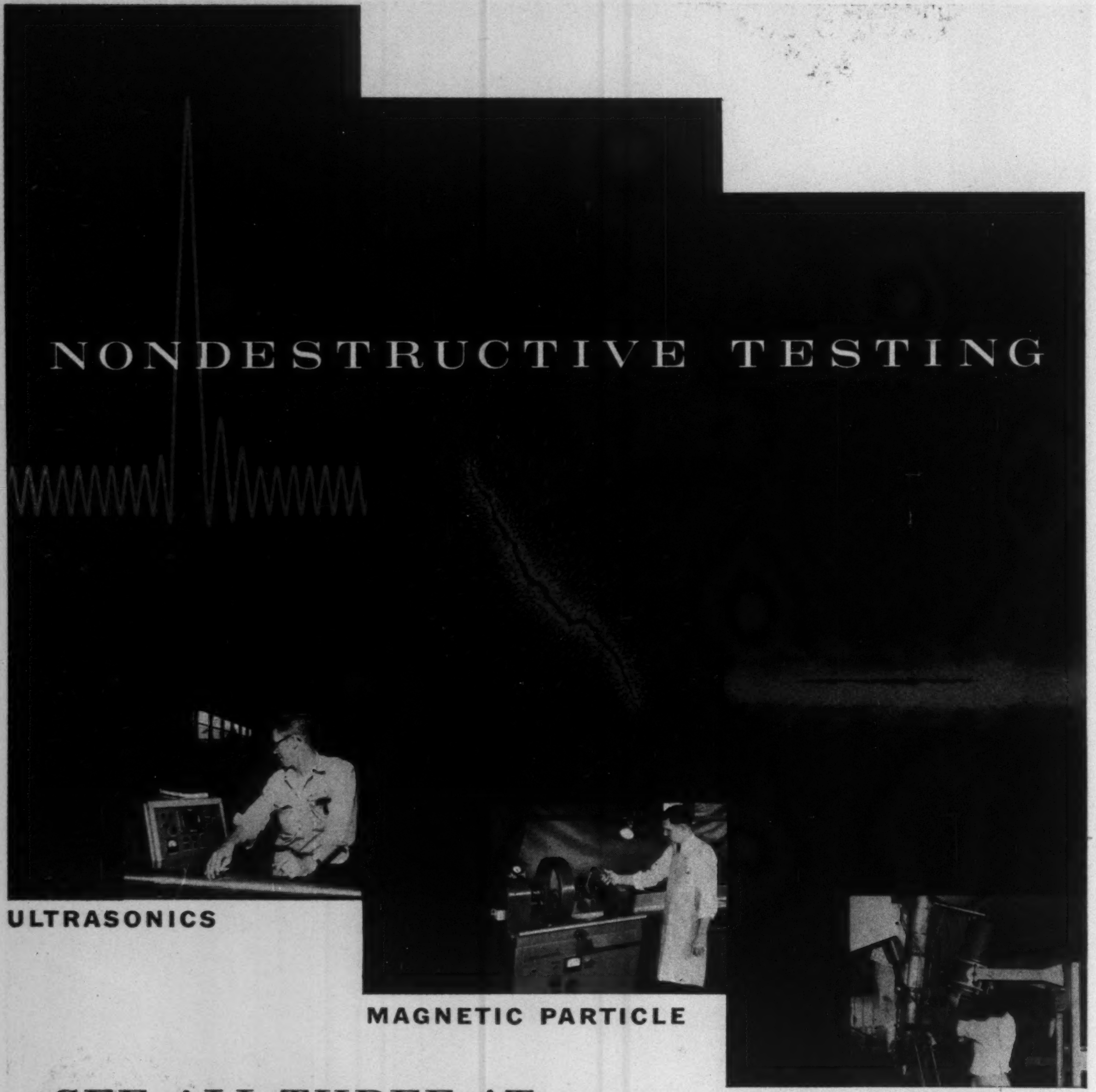
ERIE

ONE OF THE GREAT NAMES
IN FORGING SINCE 1895

ERIE FOUNDRY CO., Erie, Pa.

EF-60-01

NONDESTRUCTIVE TESTING



ULTRASONICS

MAGNETIC PARTICLE

INDUSTRIAL X-RAY

SEE ALL THREE AT THE METAL SHOW

Demonstrations of the newest developments and techniques in nondestructive testing will be featured in the Sperry Products Company booth at the Metal Show in Philadelphia this October. The addition of Sonoflux® magnetic particle equipment and Triplett and Barton Industrial X-Ray to Sperry's line of ultrasonic test instruments and systems provides Sperry with the most versatile range of nondestructive testing devices and techniques available from one source.

If you can't make the show, call on your Sperry Sales Engineer. He is fully prepared to evaluate your quality control problem.

Sperry

TRIPLETT BARTON

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Sperry Products Company
DIVISION OF HOWE SOUND COMPANY
3010 Shelter Rock Road Danbury, Connecticut

HOW DO YOU WELD STAINLESS?

With stick electrodes?..by gas shielded metal arc welding (Aircomatic®)?..by gas shielded tungsten arc welding (Heliweld)?

Airco supplies electrodes or wire for *all three*, can give unbiased advice, broad selection. Are the stainless steels that you weld light gauge or heavy . . . martensitic, ferritic or austenitic . . . subject to heat, corrosion or stress? Whatever the application, Airco supplies electrodes or wire to weld them *better*.

For stick electrode welding: choose from 36 Airco Stainless Electrode types. They give you high welding speed with low heat input. Welds are smooth, spatter is minimal, cleaning and polishing are easy. Bonus: electrodes are protected in Airco's exclusive resealable "POP" can; it keeps them factory-fresh down to the last electrode.

For inert gas shielded processes: depending on application, you'll choose either AIRCOMATIC® gas shielded metal arc welding—or Airco's HELIWELD gas shielded tungsten arc welding. For both of these processes, Airco Stainless steel welding or filler wire gives excellent corrosion resistance and excellent tensile, ductility and impact properties.

Which is best for you? Call Airco for an unbiased answer—for *only* Airco makes equipment for all three processes. Look in Classified Telephone Directory under "Welding Equipment and Supplies" for your nearest Authorized Airco Distributor. Write today for a copy of Airco's "Electrode Pocket Guide" and "Aircomatic Welding Wire Pocket Guide."

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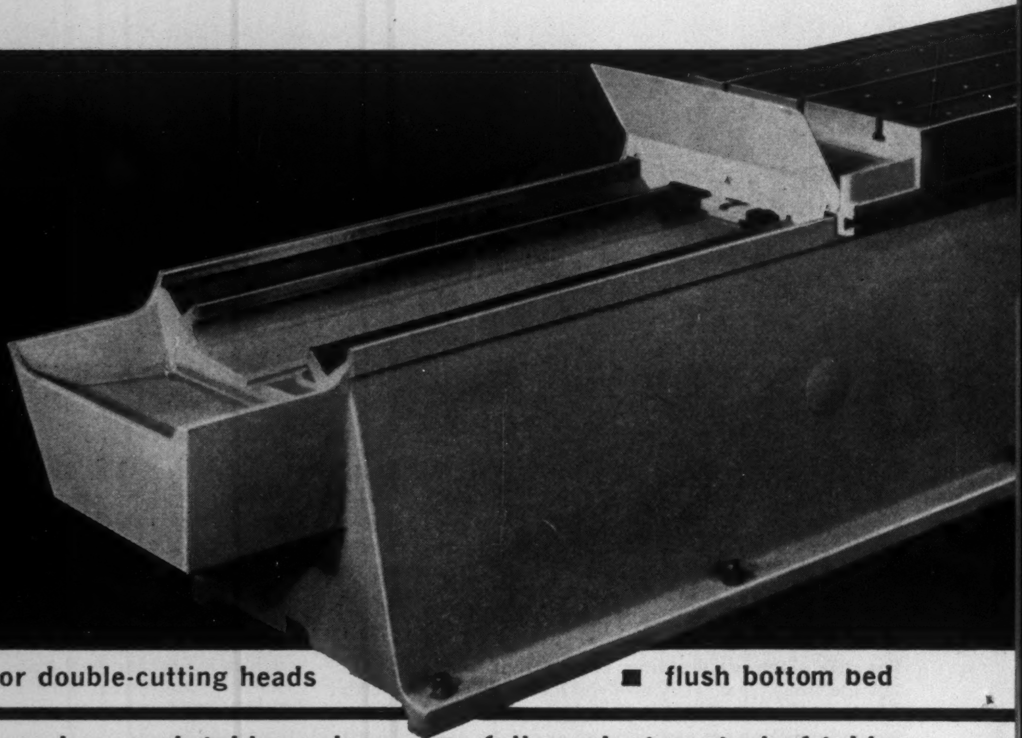
imagine

buying a **GRAY** planer for only

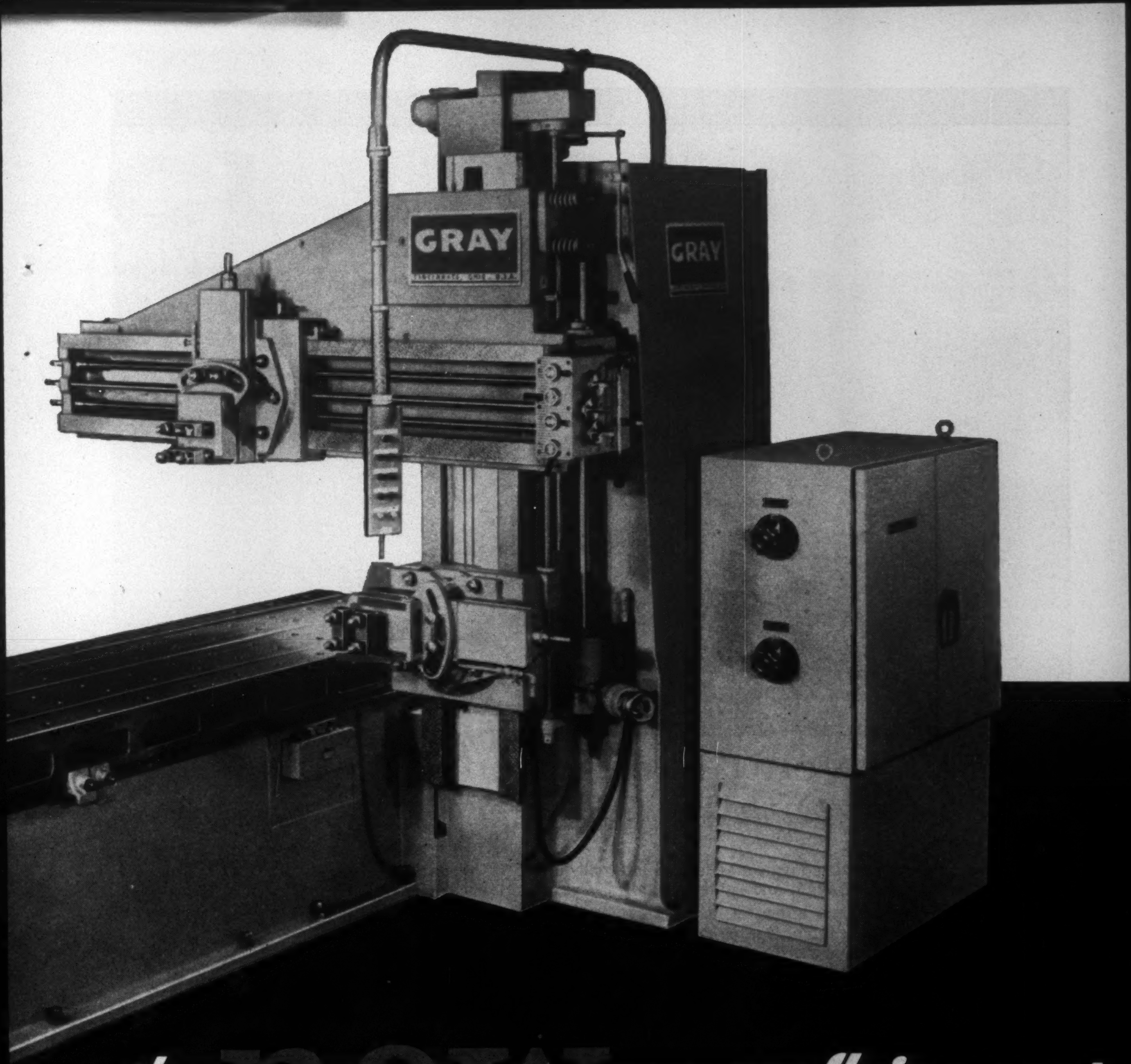
$30,660

above basic price includes 30" x 6' planer, one rail head, electric drive and controls



- available with single or double-cutting heads
- flush bottom bed
- new Gray knee
- synchro-mesh table replacer
- full pendant control of table
- Gray Safety nut
- full floating drive shaft
- quick acting saddle and slide clamps
- abutment tool aprons
- non-shock pneumatic tool lifters
- infinite feed range

technical bulletin available



the new 30"-36"-42" flying scot

■ square locked throughout ■ knee and rail counterbalance ■ pyramid side walls on bed

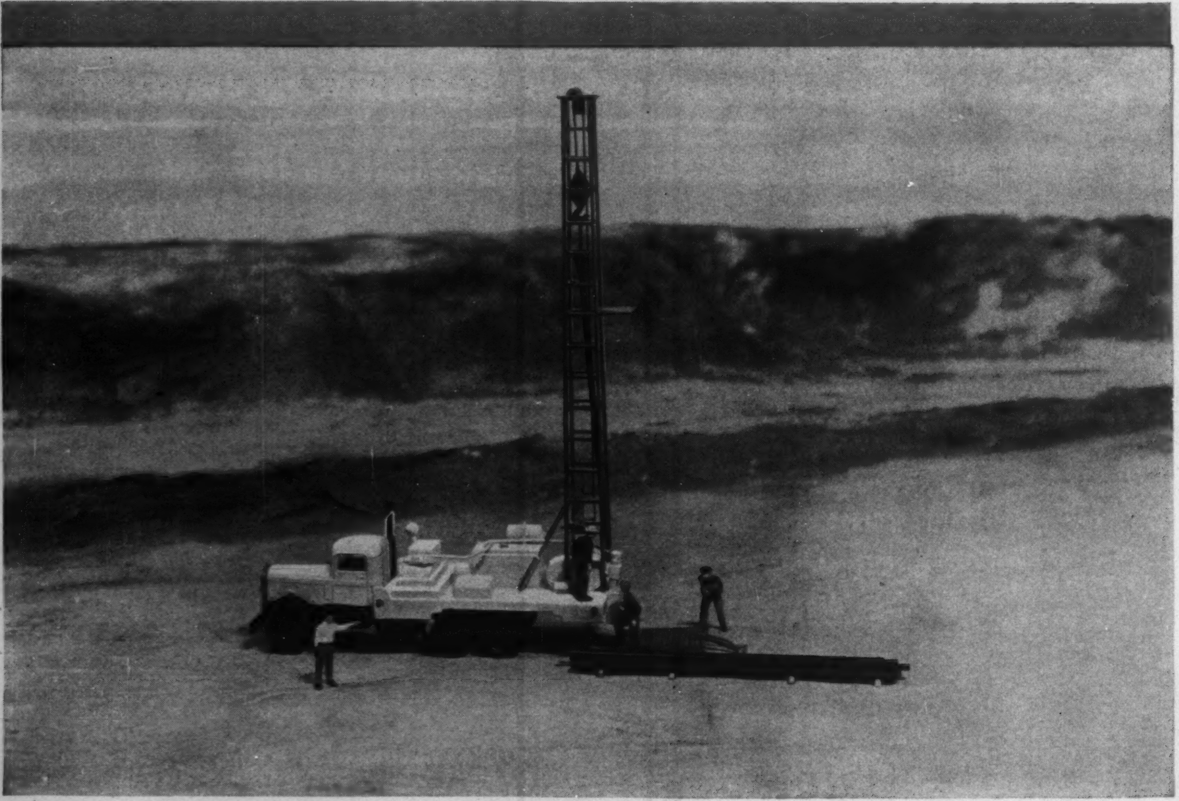
■ vee ways ■ gray non-metallic ways—optional ■ maximum capacity—table width

■ 'reservoil' lubrication ■ high table speeds ■ duplex tables optional ■ new column

■ helicone transmission ■ space saver drive ■ table safety stop ■ forced lubrication

horizontal milling and boring machines
planers
planer type milling machines

THE G. A. GRAY CO.
CINCINNATI, OHIO



Down-to-earth reasons for using Custom Quality OHIO Tubing

As in rotary drilling, which uses steel tubing internally upset by Ohio Seamless, greater strength and lighter weight may be important in your product.

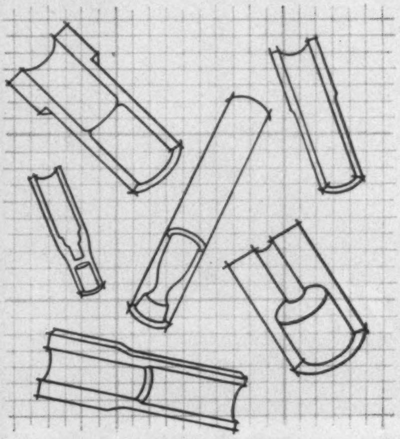
So before selecting a tubing source consider these important facts. OHIO Tubing is always the exact tubing you need for your product because OHIO Tubing is CUSTOM MADE for your product. Your order is manufactured to your own specifications to produce steel tubing especially for your application — the precise grade, analysis, size, shape, special anneal and tolerances best suited to your needs.

Ohio Seamless Tube produces both seamless and electric welded steel tubing — is prepared to form many finished or semi-finished tubular parts to your designs.

To get the most from your next steel tubing order, use Custom Made OHIO Tubing. Contact your nearest Ohio Seamless representative, or send part drawings to the plant at Shelby, Ohio — Birthplace of the Seamless Steel Tube Industry in America.

A-3061A

Model illustrated built to 3.5 mm scale.



Typical Ohio Seamless tubular upset forgings

OHIO

OHIO SEAMLESS TUBE

Division of Copperweld Steel Company • **SHELBY, OHIO**

Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

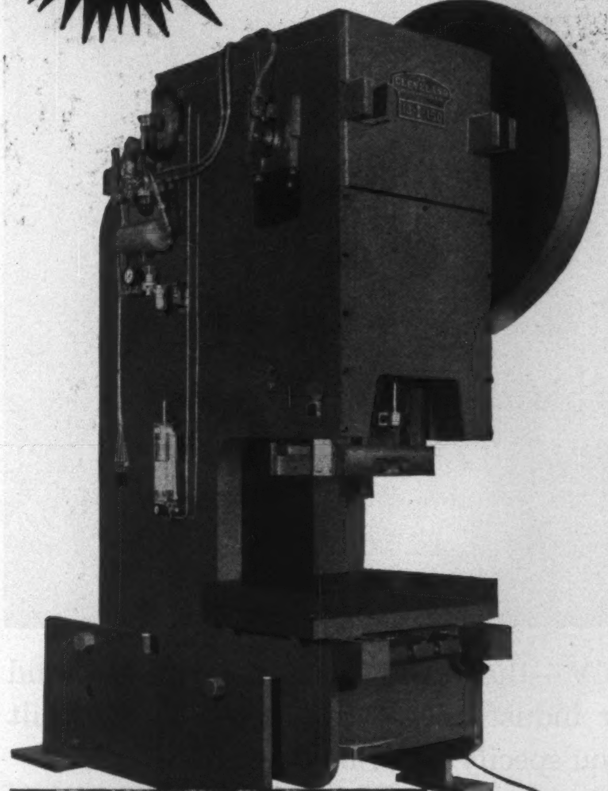
SALES OFFICES: Birmingham, Charlotte, Chicago (Oak Park), Cleveland, Dayton, Denver, Detroit (Huntington Woods), Houston, Kansas City, Los Angeles (Lynwood), Miami, Moline, New York, New Orleans (Chalmette), Philadelphia (Wynnewood), Pittsburgh, Richmond, Rochester, St. Louis, St. Paul, Salt Lake City, Seattle, Tulsa, Wichita

CANADA: Railway & Power Engr. Corp., Ltd. • EXPORT: Copperweld Steel International Company, 225 Broadway, New York 7, New York

...DOES TOUGH JOBS *Dependably, Profitably*

CLEVELAND

NEW WELDED-FRAME COST-CUTTING *Open Back Inclinable* PRESSES



- Stronger structural frame—streamlined and built to withstand the shock and vibration of heavy-duty stamping.

Dies last longer with less downtime for die maintenance due to Cleveland's large box-type slide that results in greater production accuracy.

75 to 200-ton capacity, built for safer, more efficient operation with all gears and drive mechanism guarded.

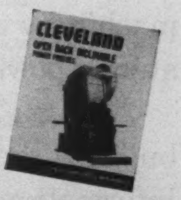
Ruggedly built for many different press operations, material can be fed in from either side or from front to back.

Three different positions—vertical, 15° and 30°—to accommodate various types of dies and at the same time make use of gravity feed and discharge in automated production lines, or in operations using a single press.

You get better stampings for less with a CLEVELAND Press—the new welded-frame cost-cutting Cleveland OBI Press.

◀ At the Middletown Manufacturing Co. in Middletown, Ky., this new welded-frame Cleveland OBI Press is blanking and piercing 3/16"-thick steel for reclining chair fixture parts and blanks for compressor cases. This Model 13-I has 150-ton capacity, 6" stroke of slide, 4" slide adjustment, 30 x 45" bed area and operates at 35 strokes per minute.

Write Today for Cleveland's OBI Press Catalog OBI 3-60



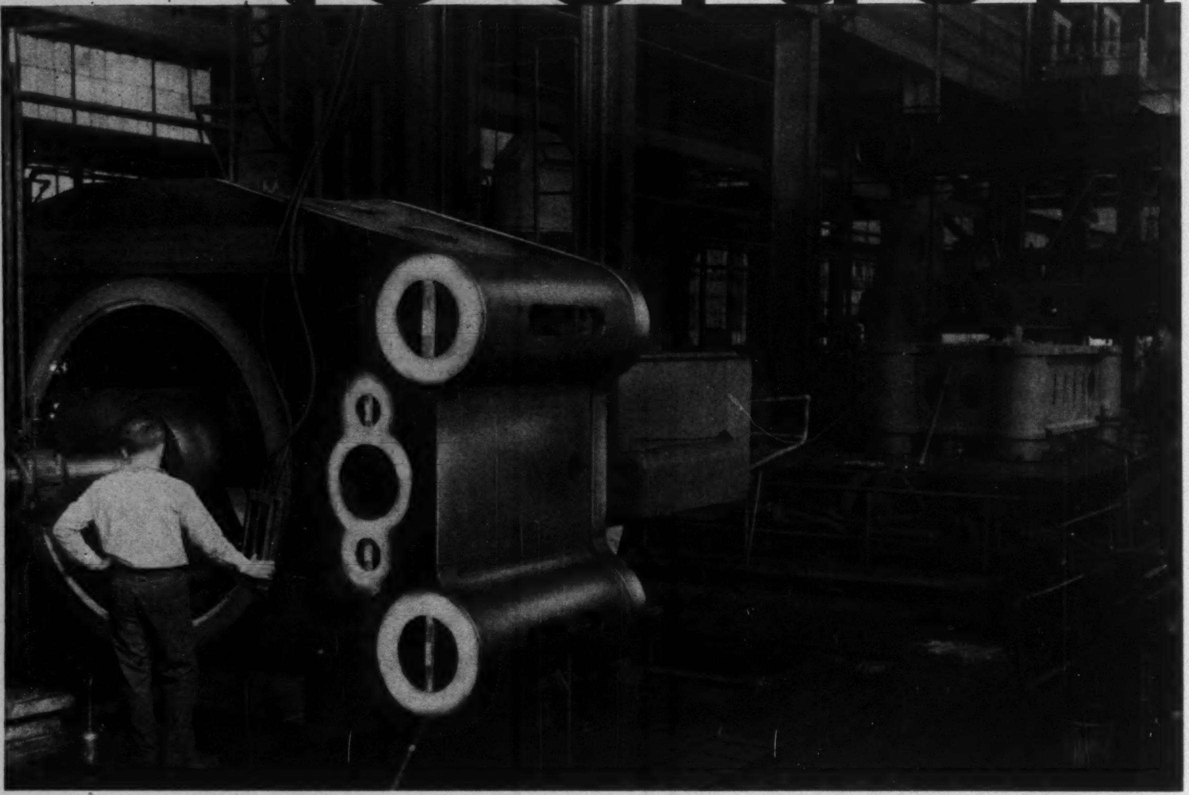
THE
CLEVELAND
PUNCH & SHEAR WORKS CO.
Established 1880

Power Presses
Fabricating Tools
Punching Tools & Dies

E. 40th and St. Clair Avenue, Cleveland 14, Ohio

A-[illegible]

Build exactly what you want • • • to order!



VERSATILITY—that's the word for Sun Ship. And that's why you get the machinery or industrial equipment you need, built exactly to your requirements, when you specify Sun Ship.

Consider, for example, the machining operations shown above. To the left is a press cylinder being machined on a 72″ Draw-shaper and to the right is a large platen on a 14′ wide Planer. Here we custom-produce a wide variety of machinery or machine components to do difficult jobs in petroleum, chemicals, atomic power—in many fields.

If you would like to investigate the advantages of Sun Ship machine building service, why not contact our Sales Engineering Department now? For information and data on any phase of our service, simply write

Sun

SHIPBUILDING & DRY DOCK COMPANY
ON THE DELAWARE • SINCE 1916 • CHESTER, PA.

New

RED RING MACHINE SHAVES LARGE GEARS FASTER . . . MORE EFFECTIVELY

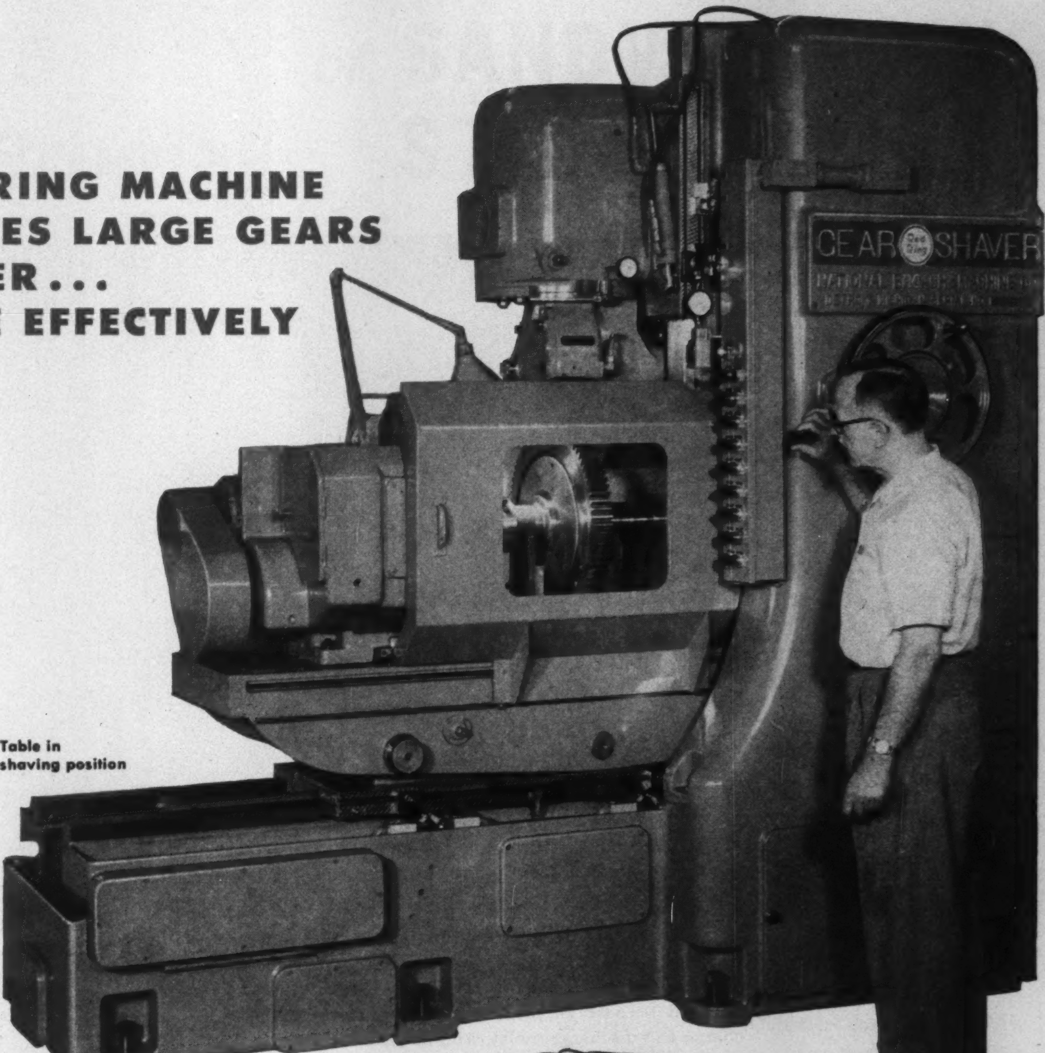


Table in shaving position

Significant design innovations in the New Model GCX enable you to shave the larger, heavier gears (up to 24" Pitch dia.) with the same facility and precision as smaller gears are shaved.

Methods of loading and unloading are unrestricted. The work is loaded with the table at the extreme limit of its travel—clear of any overhead interference.

At the end of the shaving cycle, the cutter head rises in rapid traverse to clear the work and the table returns to its loading station for quick unloading.

If you manufacture such gears as are used in trucks, agricultural or ordnance equipment, ask for Bulletin S60-8 and get the full details of this new, economical method of gear shaving.

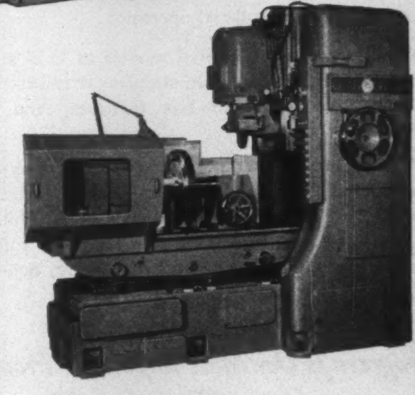


Table in loading position

EXCLUSIVE RED RING ADVANTAGES

- Cutter above the work permits chips to fall away from and not into the cutter teeth.
- Thus positioned, the cutter is not vulnerable when the work is accidentally dropped while being loaded.
- Cutting pressure is applied downward, taking full advantage of gravity for rigid stability.
- Floor space, less — Rigidity, greater

SPUR AND HELICAL GEAR SPECIALISTS
ORIGINATORS OF ROTARY SHAVING,
GEAR HONING AND ELLIPTOID

NATIONAL BROACH & MACHINE CO.

5600 ST. JEAN • DETROIT 13, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING AND HONING EQUIPMENT

General Electric Announces

Two heat treating innovations at 1960 Metal Show

1. A startling development that can cut your heating time 85%. This completely new approach to heat treating has never before been offered by any furnace manufacturer. You can see it for the first time at General Electric Booth 1610.

2. An AUTOMATIC INDEXING high purity box furnace that operates up to 2350 F. There's no muffle, and dew points down to minus 60 F can be achieved. Minimum floor space is required because no mechanisms or parts extend beyond charge and discharge tables. And no additional work area is required for push and pull rod operation.

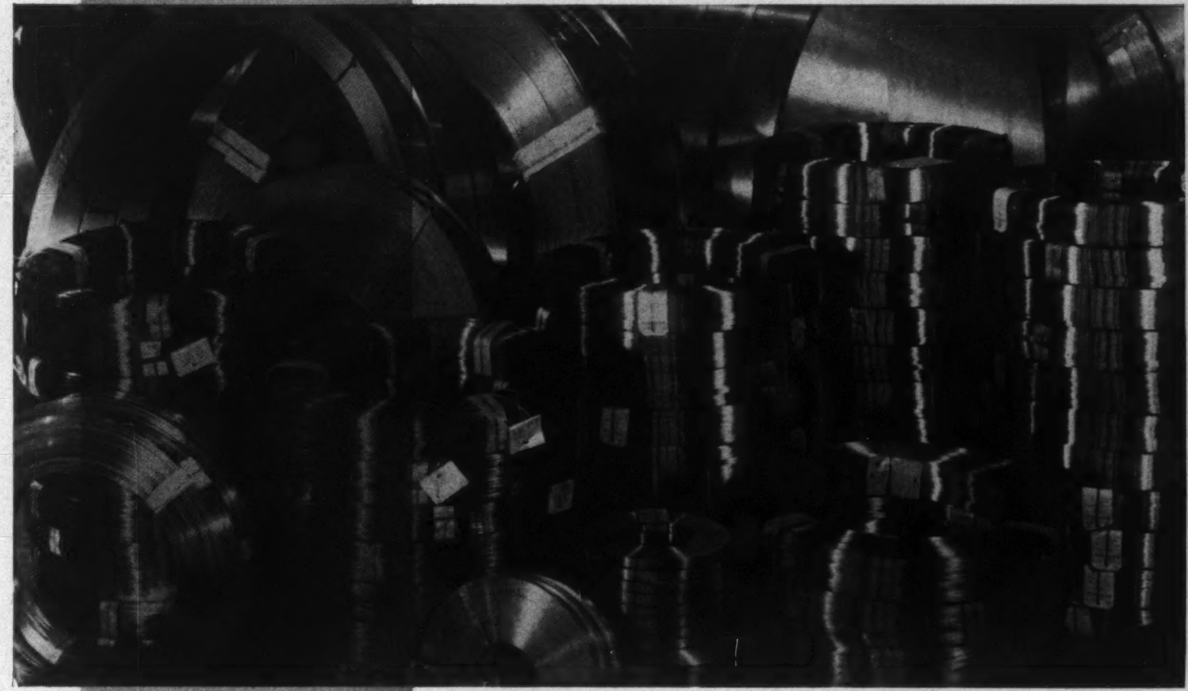
Also exhibited will be detailed models of G.E.'s new and standardized lines of mesh belt, stainless strip bright annealing, gantry, elevator, and box furnaces; and nitrogen producers.

Don't miss these important industry innovations shown for the first time at G-E Booth 1610 at the 1960 Metal Show, October 17-21, Trade and Convention Center, Philadelphia. And if you can't get to Philadelphia, write for information to Section 756-06, General Electric Company, Schenectady, New York. 756-06

Progress Is Our Most Important Product

GENERAL ELECTRIC

15 Proofs of SANDVIK SPRING STEEL QUALITY

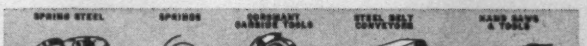


For up to 40 years Sandvik Specialty Steels have been used successfully for —

1. Compressor Valves
2. Band Saws
3. Piston Ring Springs
4. Conveyor Belts
5. Doctor Blades
6. Feeler Gauges
7. Clock & Watch Springs
8. Vibrator Reeds
9. Shock Absorbers
10. Razor Blades
11. Surgical and Special Knives
12. A wide variety of Springs
13. Textile Machinery Sinkers, Needles, etc.
14. Camera Shutters
15. Masons Trowels

This list of exacting applications is the strongest proof of Sandvik steel's consistent quality. Over the years, these users have found that when product performance depends on *specific physical properties, high fatigue life, accurate and uniform flatness, straightness, gauge, width and finish,* Sandvik quality is well worth its price.

Ask your nearest Sandvik office for further information or technical assistance.



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88-220

Dann Goodson, *Manager Motor-Driven Compressor Sales,*
The Cooper-Bessemer Corporation, explains...

How Cooper-Bessemer's new, compact Air Compressors simplify installation and reduce costs

The DMR compressors shown here are two models of a new line of *compact, 720 rpm* machines, unmatched in reliability. With these units, Cooper-Bessemer introduces a new standard of installation economy. So highly compact, the DMR compressors are readily installed in existing space, avoiding the need for additional housing facilities. They can be located at strategic points throughout the plant to supplement existing air line services without additional feeders to help supply your production needs at minimum cost.

The new DMR units come completely equipped with integral motor-drive and intercooler... ready for operation. Their control can also be integrally mounted as shown. They are available for two-stage applications in the range of 500 to 2000 cfm and discharge pressures of 80 to 125 psi... also for single-stage and three-stage operation.

air

The introduction of this new line of air compressors, plus the portable tool facilities of our new subsidiary, The Rotor Tool Company, enable Cooper-Bessemer to give you full-scope service for your industrial air power needs. Call the nearby Cooper-Bessemer office or air compressor agent for Bulletin No. 94 on the new DMR line.

BRANCH OFFICES: Grove City • New York • Washington • Gloucester • Pittsburgh Chicago • Minneapolis • St. Louis • Kansas City • Tulsa • New Orleans • Shreveport Houston • Greggton • Dallas • Odessa • Pampa • Casper • Seattle • San Francisco Los Angeles

SUBSIDIARIES: Cooper-Bessemer of Canada, Ltd.... Edmonton • Calgary Toronto • Halifax • Stratford
C-B Southern, Inc.... Houston
Cooper-Bessemer International Corp.... New York • Caracas • Anaco
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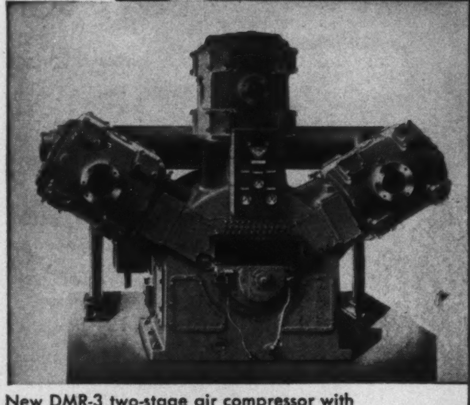
The Rotor Tool Company... Cleveland

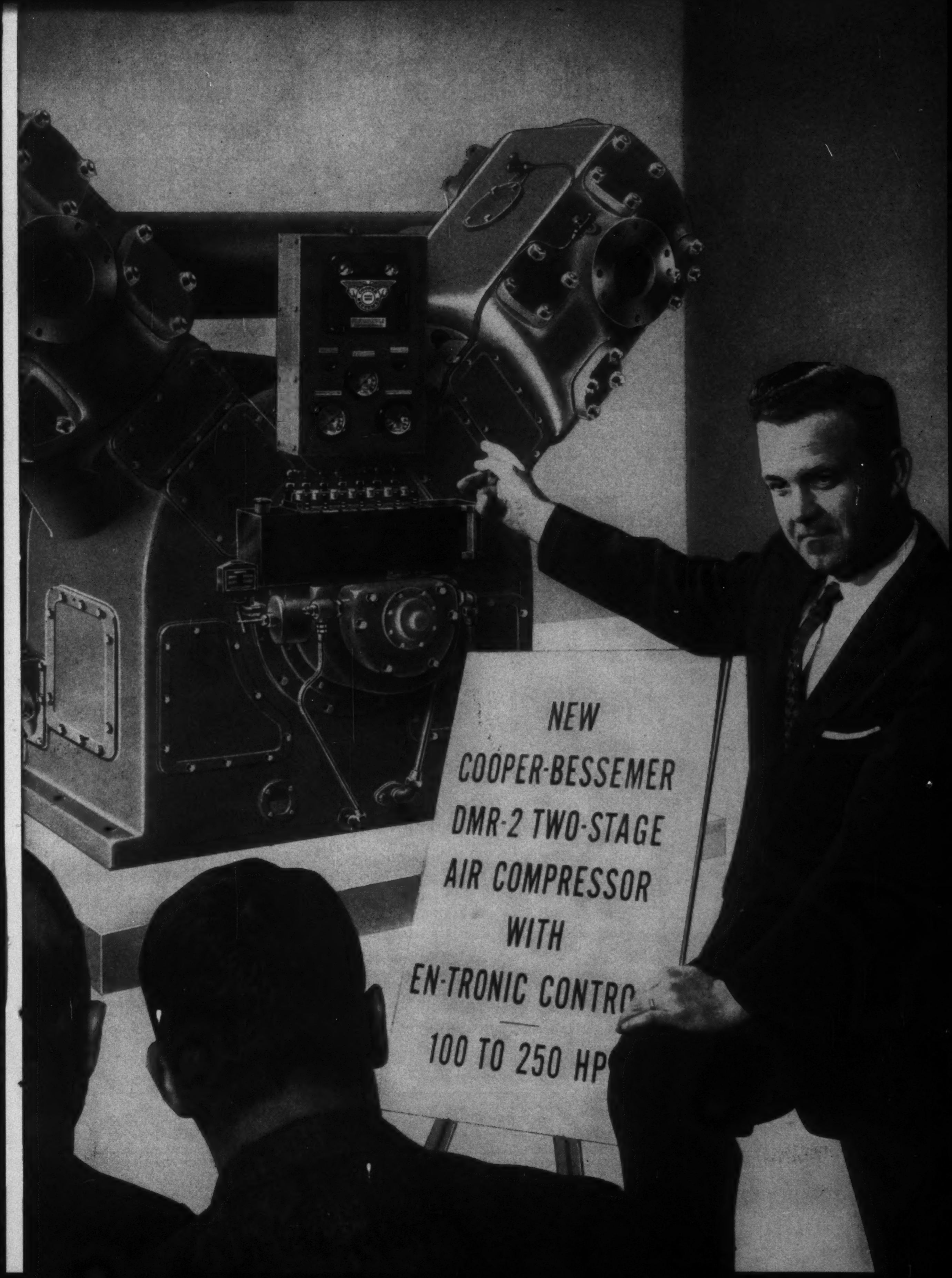
Cooper-Bessemer

GENERAL OFFICES: MOUNT VERNON, OHIO

ENGINES: GAS • DIESEL • GAS-DIESEL
COMPRESSORS: RECIPROCATING AND CENTRIFUGAL
ENGINE, TURBINE OR MOTOR DRIVEN

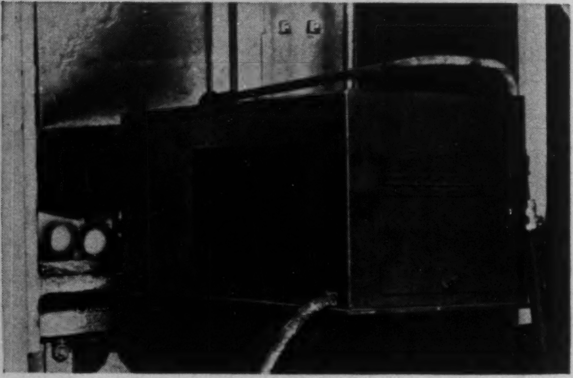


New DMR-3 two-stage air compressor with integral control. Ratings of 300-350 hp.

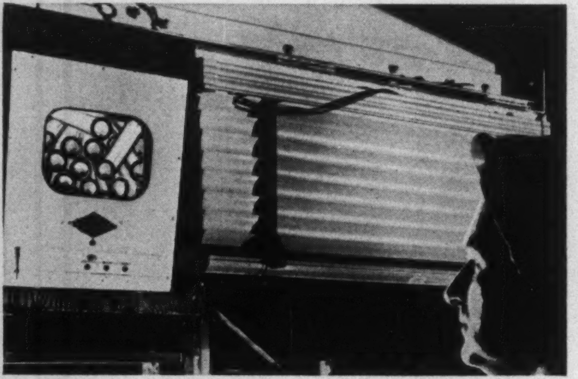

NEW
COOPER-BESSEMER
DMR-2 TWO-STAGE
AIR COMPRESSOR
WITH
EN-TRONIC CONTRO
100 TO 250 HP

How Diamond TV cuts costs for Timken Company

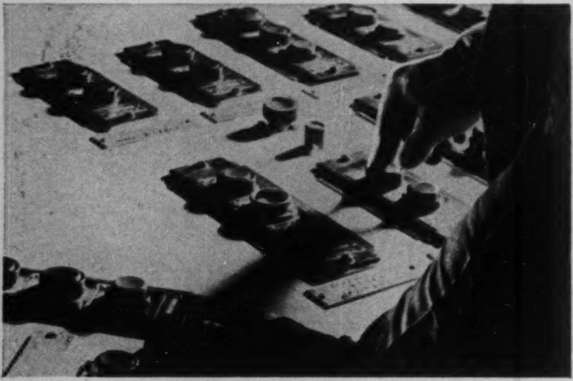
"Utiliscope"® *pays for itself in just eight months*



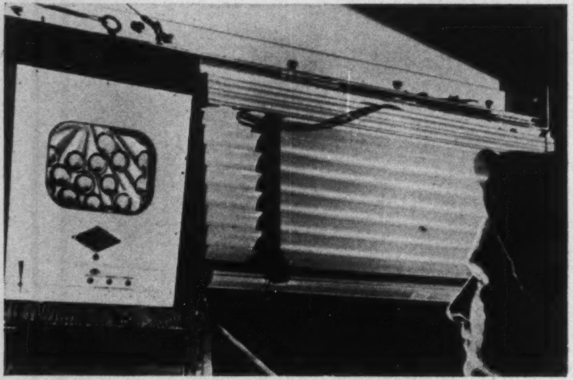
1 Air-cooled TV camera peers inside tube-cooling furnace, transmitting continuous picture to dispatcher in control pulpit 100 feet away. Dispatcher checks television monitor image which shows progress of tubes on walking beam conveyor — watches for pile up of tubes at conveyor exit.



2 Dispatcher, monitoring TV screen, spots a tube pile up instantly. Time lag in old method . . . hand signals from man at furnace port . . . could not have prevented piled tubes from gouging furnace refractory lining before conveyor could be stopped. Costly damage is eliminated . . . production efficiency improved!



3 With piled tubes realigned, cooling production continues with conveyor speed adjusted to prevent recurrence. Dispatcher now flips to second "Utiliscope" on adjacent annealing oven — the next step in tube production where tubes are piled cord-wood style.



4 In annealing furnace, tubes are picked off one at a time at back of furnace by powered rollers under dispatcher's control. Here, dispatcher watches for bridging of tubes which can prevent movement onto delivery conveyor. All clear here, again no spotter is required, again production flow is smoothed and protected with extreme accuracy.

In summary, one dispatcher at Timken's Canton, Ohio, Steel Mill now controls with greater overall efficiency: (1) tube mill, (2) tube cooling furnace, (3) annealing oven. Ambients at the camera location are above 125°F. Tube making is a hot process. It is in this hot spot that signalmen, formerly required, had to work. The signalmen are now working on more skilled jobs in relatively cool work areas.

Diamond's "Utiliscope" provides the metals industry the opportunity to eliminate non-productive tasks, centralize production control, reduce waste, increase employee morale, and gain new operating safety.

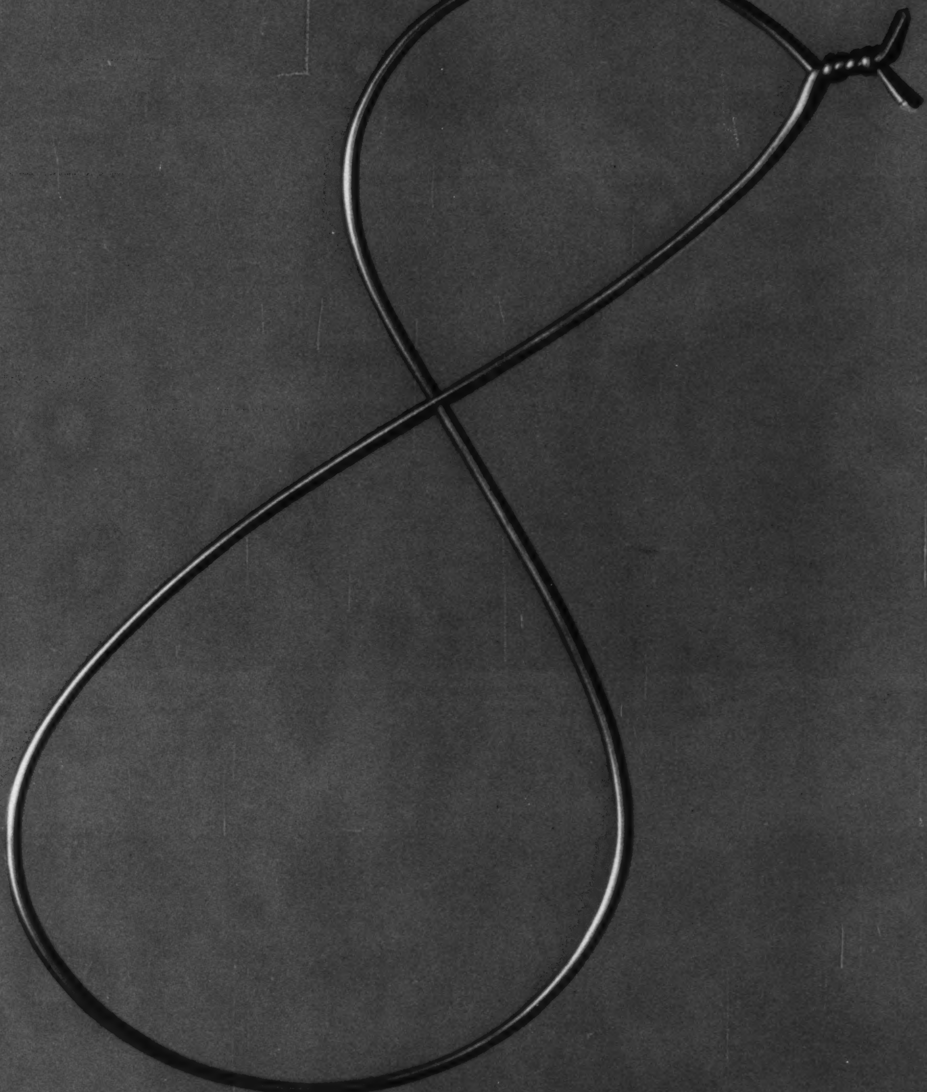
Our trained application engineers know the problems of providing effective trouble-free service in hot, tough, dusty locations. They are available to you as assistants in your analysis of the application of television to your open hearth, oxygen process, slab reheat, melting tables, strip mills, shears, raw materials, handling, pouring . . . or any of the other more than thirty known applications.

Why not request Field Survey FS33A today? Phone Lancaster, Ohio, OLive 3-6540 or TWX 490.

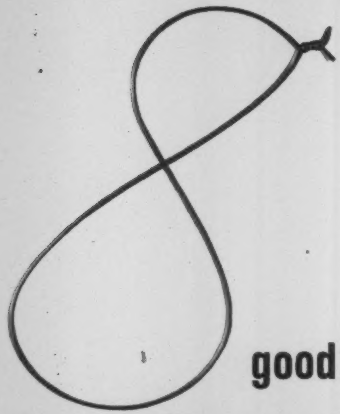
HELP WANTED . . . *Challenging opportunities available at Diamond Electronics for physicists, electronic and mechanical engineers. Contact C. H. Thomas, Technical Personnel.*

Diamond® Electronics

DIVISION OF DIAMOND POWER SPECIALTY CORPORATION
LANCASTER, OHIO

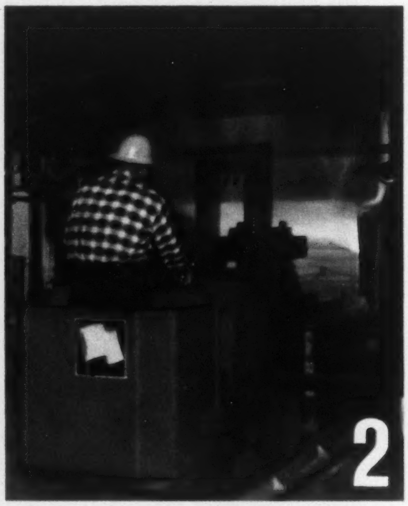


good reasons why it pays to specify American Steel & Wire for all of your stainless steel wire needs



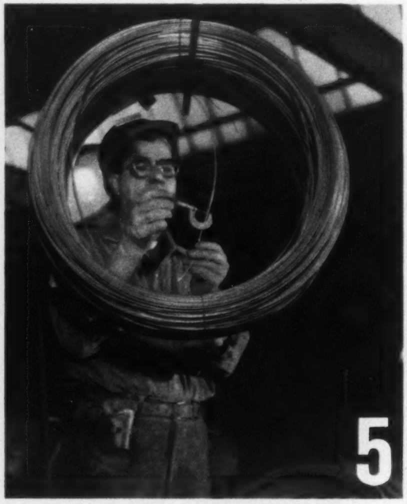
8 good reasons why it pays to specify American Steel

By using modern welding techniques, we can turn out continuous coil weights as heavy as 500 pounds to suit your particular needs. Heavier coil weights reduce down time on your machines, speed handling of material.



The latest in controlled annealing methods enable us to produce uniform properties in stainless wire that assure consistent performance on your equipment and in your product.

To insure the gage of your stainless is consistent from end to end, it's checked constantly during the continuous drawing process. ASW's wide range of modern, precision drawing machines can turn out everything you need in type, size and finish.



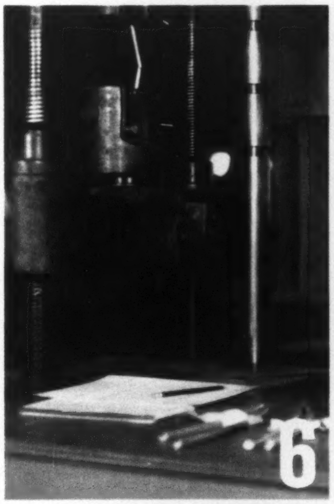
After drawing, the wire is again inspected to make certain that the gage and finish are exactly as specified.

This mark tells you a product is made of modern, dependable Steel.

& Wire for all of your stainless steel wire needs

3

Up-to-date salt and acid bath techniques and equipment guarantee the smooth, clean wire surface so important to the finished quality of your product. After cleaning, coatings such as this electrolytic copper coating are often applied to make your job of fabrication easier.


6

During processing and at finished size, our stainless wire is tested for tensile strength and other properties to make sure it meets specifications. Such tight control insures quality.

7

To insure supply and fast delivery, we stock 300 to 400 tons of cold heading stainless wire in addition to a heavy tonnage of other stainless steel wire items at all times.

8 **Our stainless steel wire service is second to none.** In addition to our regular salesmen, we have special Stainless Steel representatives in your area who have both engineering and mill backgrounds. They know metals, they know production. Their assistance can be invaluable to you in solving the really tough ones. Call your nearest ASW Sales Office today. If you like, we'll have a man out to see you at your convenience. Or if you prefer, write American Steel & Wire, Dept. 0382, 614 Superior Avenue, N.W., Cleveland 13, Ohio.

American Steel & Wire
Division of
United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
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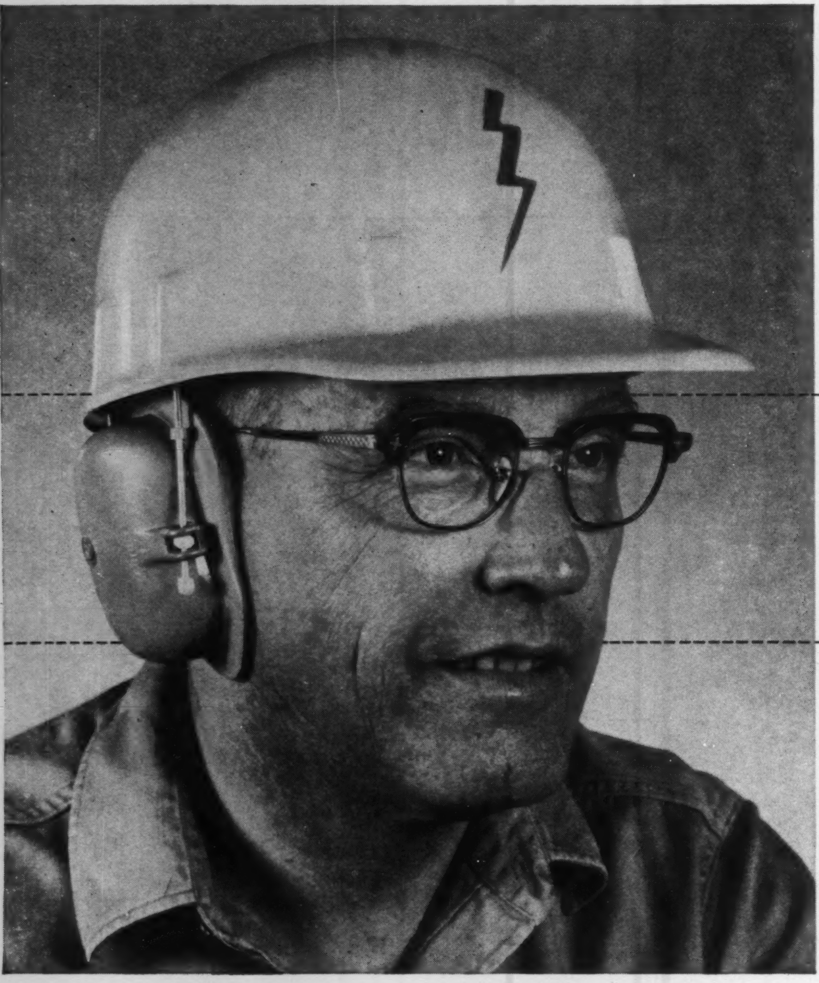
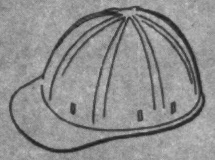
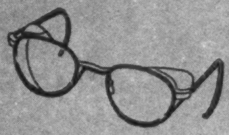
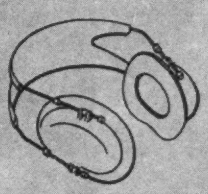




Bausch & Lomb
Safety Caps and Hats



Bausch & Lomb
Safety Frames and Lenses



Bausch & Lomb
"Quiet-Ear" Protector

WHAT THE WELL-PROTECTED HEAD WILL WEAR...Protection-PLUS

safety coordinates by Bausch & Lomb

Protection *plus* economy!

You'll save on the longer life of B&L safety products—and on the accidents they prevent. That's because we build an extra margin of safety into them. Bal-SAFE lenses, for example, average 14 times the impact-resistance required by government standards. Yet you pay no more for the *extra* protection of B&L.

Protection *plus* worker acceptance!

It stands to reason that B&L has the edge in designing comfortable fit and smart appearance into safety products. Because we've been meeting the critical demands of the ophthalmic professions for over a hundred years. We know head shapes and fitting procedures. The protection is in the wearing—and workers *wear* B&L safety products because they fit right and they look good.

Find out how on-the-job interchangeability lets you fit all your workers, for all job hazards, from a minimum inventory. And see how readily B&L safety products are accepted . . . and *worn!* Call your supplier, or write: Bausch & Lomb Incorporated, 98510 Lomb Park, Rochester 2, New York.

BAUSCH & LOMB
SINCE B&L 1853

Protection PLUS
Safety Products

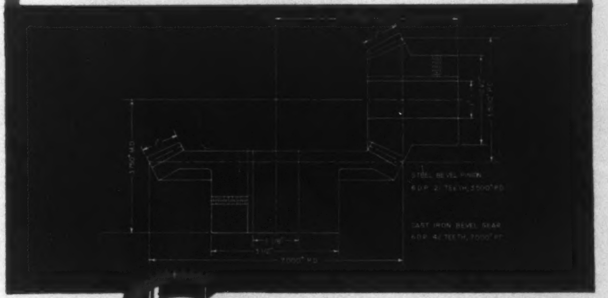
protection + economy + worker acceptance

Gregory Grant says —
COMPARE THE COSTS!
STOCK GEARS $21.90 PAIR
GRANT Customized GEARS $15.75 PAIR
GRANT

MAKE YOUR OWN COMPARISON . . .
CALL ANDREW 8-4409 COLLECT

Here is a typical comparison — 50 sets of gears and pinions to meet assembly specifications:

Set of stock gears unaltered	$20.20	Set of Grant customized gears to your specifications, ready for installation
Rebore shaft hole/per pr.	.80	
Cut keyway/per pr.	.50	
Drill and tap for set screw/per pr.	.40	
	$21.90 pair	$15.75 pair



We believe we can prove on your next O.E.M. application that you can save 25% in actual costs when you specify Grant *customized* gears, instead of making time-consuming alterations to stock gears to fit your needs.

So call us — collect — we will gladly quote on your needs, no obligation, of course.

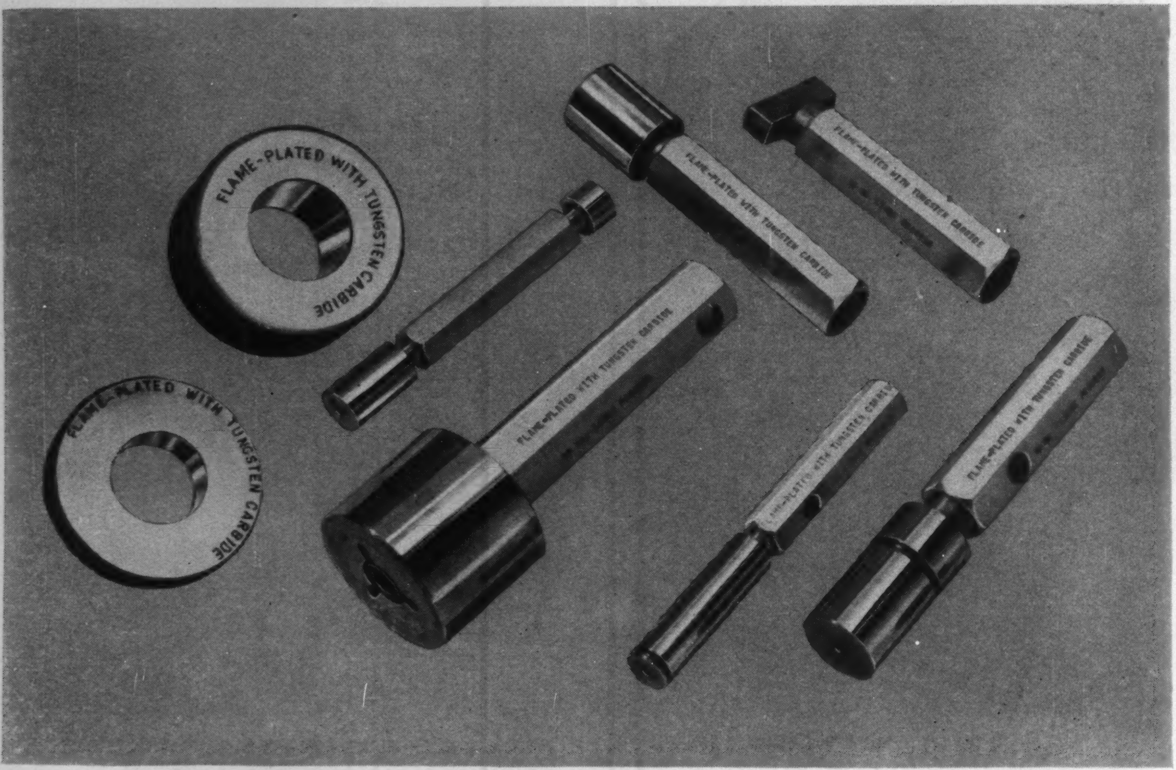
CALL COLLECT — THE NUMBER IS ANDREW 8-4409 FOR THE BEST IN CUSTOMIZED GEARS.

ESTABLISHED
IN 1877

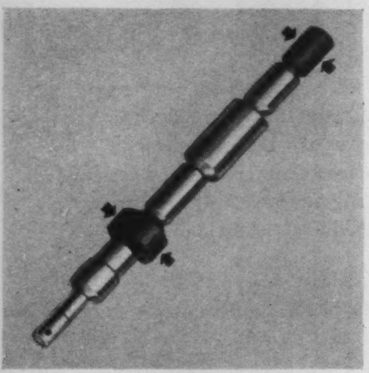
GRANT GEAR WORKS, INC. WEST SECOND STREET, BOSTON 27, MASS.

• *Catalog Available on Customized Gears* • *Precision Gears* • *Speed Reducers*

PRECISION PARTS GET TODAY'S LINDE's FLAME-


FLAME-PLATED WITH TUNGSTEN CARBIDE
FLAME-PLATED WITH TUNGSTEN CARBIDE

GAGES—Superior wear resistance and other unique cost-saving advantages are exhibited by plug, ring, air, and specialty gages treated by LINDE's Flame-Plating. For example, Flame-Plated plug gages outwear solid carbide plug gages 3-to-1, and hard chrome-plated gages 20-to-1.

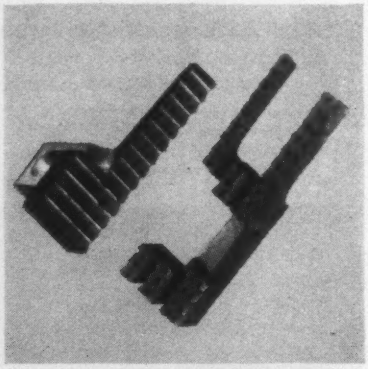


AIRCRAFT VALVES

Bearing surfaces of hot air valves used in the bleed air system of Lockheed's F-104A Starfighter must meet extreme conditions of wear and abrasion, also conditions of high unit loading and temperature extremes. Flame-Plating these surfaces with tungsten carbide solves the problem.

ALUMINUM ROCKER ARMS

One side of the "fin" of this important item in an aircraft engine heater mechanism actuates a lever and is subjected to severe wear. Before Flame-Plating, it lasted from 100 to 300 hours. Coating the wearing surface with tungsten carbide boosted service life to more than 1000 hours.



SEWING MACHINE FEED DOGS

LINDE's Flame-Plating has increased by more than six times the service life of the movable, serrated part that pushes material through the sewing machine. In this application, a .002-in. coating of tungsten carbide in as-coated condition provides both long wear and dependable gripping.

LONGEST SERVICE LIFE with PLATING

Gages and other components achieve remarkable resistance to wear when coated with tungsten carbide and other materials by LINDE's 6,000-degree, supersonic "weld-on" process . . .

NOW—many of the profit-consuming problems of metal wear and machine down-time have been eliminated.

With LINDE's Flame-Plating, gages, spindles, bushings, seals, mandrils, dies, core rods and other precision parts and components retain their precision and close tolerances for the *longest* period of time—under the toughest conditions of abrasion, erosion, corrosion, and high-temperature wear.

LINDE's exclusive service coats base metals with particles of ultra-hard materials, such as tungsten carbide and aluminum oxide—heated to plasticity by 6,000 degrees F. inside the Flame-Plating gun and then successively "fired" at 2,500 fps at the "target area."

The result is a tenacious, "welded-on" coating of approximately 125 microinches rms, which can be finished to the desired microinches rms.

NO WARPAGE—NO METALLURGICAL CHANGES

Despite the 6,000-degree temperature within the Flame-Plating gun, the temperature of the precision part or product being coated remains below 250 degrees F. This feature eliminates distortion and changes in the properties of base metals. Other features include low coefficient of friction and porosity of less than 1 per cent.

Wherever *continuing* precision and *optimum* wear are important factors, LINDE's revolutionary Flame-Plating gives amazingly longer service life . . . reduces production rejects . . . increases salvage value.

Find out how this coating service offered by the Linde Company can save on operating costs, make a good product even better, and improve over-all reliability. LINDE will provide a complete engineering analysis. List your possible applications in the coupon on the right and mail today for complete information.

TYPICAL FLAME-PLATING APPLICATIONS

BEARINGS—sleeve, roller, gas
BLADES—aircraft turbine; doctor blades for papermaking
BLOCKS—anvil
BUSHINGS—ball piston pump
CHUCKS—seaming
CUTLERY—household
CUTTING, INDUSTRIAL—rubber, plastic, skiving knives, foods, paper, slitter knives, chipper knives, discontinuous chip-abrasive materials
DIES, TOOLING—cold-forming; coring punches, core rods, sizing punches, capstans
DOGS—sewing machine feed; gripping dogs
DRILLS—paper, acoustical tile, twist
GAGES—plug, ring, air
GUIDES—wire, textile, machine
HYDRAULICS—pistons, liners, valve plates, wobble plates, metering valves, servo valves, slippers
MANDRILS—wire-forming
PARTS—sintered
PISTON RINGS
PLATES—valve, wear
SEALS—turbine engine, pump
SURGICAL—needle holders and shears
VALVES—aircraft

Linde Company, Flame-Plating
270 Park Avenue
New York 17, New York

I am interested in Flame-Plating for the following application(s):

____

____

____

NAME__________ TITLE______
COMPANY________________
ADDRESS________________
CITY______ ZONE___ STATE____

LINDE COMPANY
Division of Union Carbide Corporation

UNION CARBIDE

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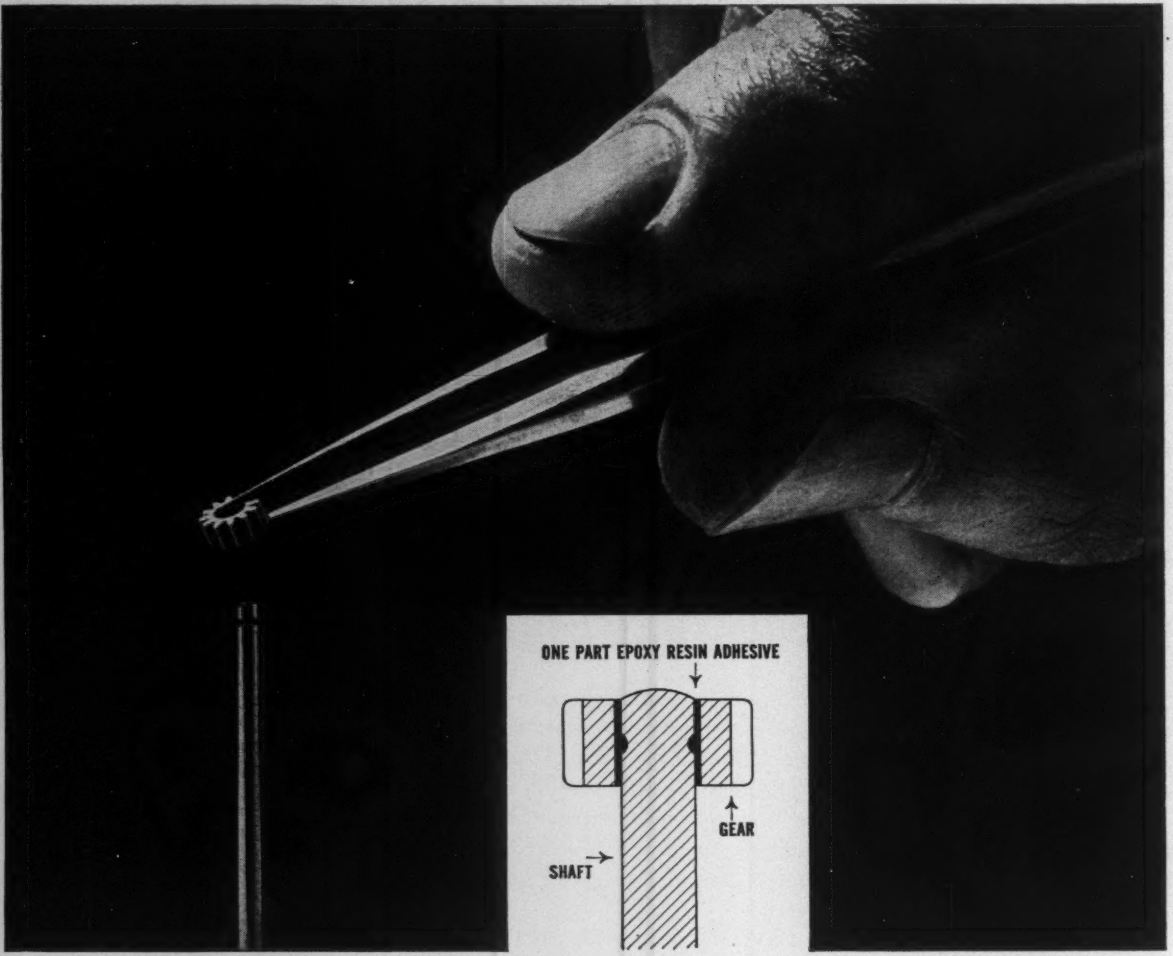


How fabricating with SCOTCH-WELD® BRAND Structural Adhesives eliminated 100% inspection step

Timing components now being fabricated with SCOTCH-WELD Adhesive EC-1386 meet precise specifications. The Haydon Division, General Time Corp., Torrington, Conn., is using this one-part epoxy resin base adhesive to bond small pinion gears to rotor shafts in a sub-assembly timing gear operation.

Prior to use of EC-1386, the parts were joined by brazing. But the high heat required affected the material hardness. It also produced shaft distortion, necessitating a 100% inspection step.

Then SCOTCH-WELD Adhesive EC-1386 was used. The high heat previously required was eliminated. With the end of this trouble source, shaft concentricity and material hardness were left unaffected, the 100% inspection eliminated. Close tolerance requirements between shaft and gear were also eliminated because of void-filling properties of the adhesive. A savings of $56.37 per thousand assemblies resulted.

Company after company is discovering how to save money, speed production and eliminate rejects by using SCOTCH-WELD Structural Adhesives in the fabrication of their products. Perhaps these adhesives are at work right now in operations similar to yours. Find out! For free literature without obligation, write today on your company letterhead to: AC&S Division, 3M Company, Dept. SBQ-100, St. Paul 6, Minnesota. "SCOTCH-WELD" is a Reg. T.M. of 3M Co.

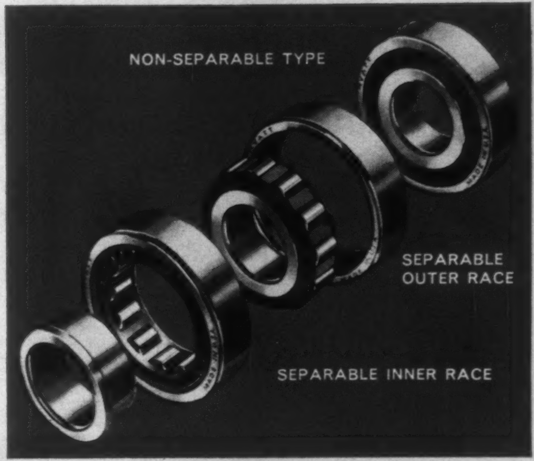
ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

YOU GET FIVE IMPORTANT BENEFITS WHEN YOUR "SPECS" READ HYATT



1 RELIABILITY

Hyatt reliability is measured by results. For example, The Hyatt Reliability Program embraces every phase of product development. In procurement, it weeds out all but the highest-grade raw material. In engineering, Hyatt Reliability insures efficient, accurate design. In manufacturing, it provides careful inspection and rigid adherence to specifications. And Hyatt Reliability does not stop there. Hyatt sales engineers work with you to help recommend the best possible bearing for your requirements. Then, they follow up to make sure Hyatt bearings deliver in service. And no one knows more about cylindrical bearings. For over 68 years, Hyatt has produced top-quality bearings for almost every type of application. Check the benefits that are yours when your "specs" read Hyatt.

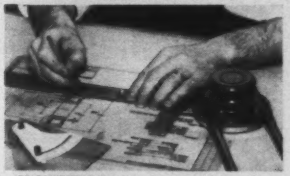
2

PRICE. Hyatt's advantages of quality, assembly practice and uniformity of product can often reduce over-all cost to you.

3

DELIVERY. Hyatt's unsurpassed production facilities deliver bearings in quantity with maximum speed and economy.

4



ENGINEERING. Hyatt's engineering is backed by the extensive research and engineering facilities of General Motors.

5

SERVICE. Hyatt Sales Engineers are trained bearings specialists who can save you man-hours and dollars.

HYATT *HY-ROLL BEARINGS*

FOR MODERN INDUSTRY

HYATT BEARINGS DIVISION, GENERAL MOTORS CORPORATION, HARRISON, N. J.

WAYNE COOK ASSOCIATES—THE NATION'S LEADING AUCTIONEERS

announces another important **SALE!**

The Western Company

ONE OF THE FOREMOST OIL FIELD SERVICE FIRMS AND PRECISION MANUFACTURERS

WILL SELL THEIR ENTIRE

MANUFACTURING PLANT and MACHINE SHOP

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PUBLIC AUCTION

THE FINEST BRANDS—EXCELLENT CONDITION—LARGE VARIETY

TUESDAY–OCTOBER 18, 1960–10:00 A.M.

MIDLAND, TEXAS

EVERYTHING SELLS

No Minimums

No Reservations

750 VALUABLE ITEMS

EVERYTHING IN TOP WORKING CONDITION

LIGHT & HEAVY MACHINE TOOLS

PRODUCTION EQUIPMENT

Plus

4 ACRES OF REAL ESTATE

Located on HWY. 80, ¼ mile West of Midland city limits.

WILL BE SOLD TO THE HIGH BIDDER

Well Improved With 17,000 Sq. Ft. Plant Building and Offices

Write For Detailed Brochure

Wayne
Cook
Associates, Inc.
"The Nation's Leading Auctioneers"

193 MEADOWS BLDG. DALLAS, TEXAS

SELLING:

GIDDINGS & LEWIS BORING MILL
CINCINNATI MILLING MACHINE
SIDNEY 17" LATHE
LODGE & SHIPLEY 25" HOLLOW SPINDLE LATHE
LEHMAN 20" LATHE
PUTNAM 36" LATHE
AMERICAN 14" LATHE
MONARCH 20" LATHE
LEBLOND 20" LATHE
CANEDY-OTTO RADIAL DRILL
SMITH & MILLS SHAPER
FOSDICK RADIAL DRILL
Most of This Equipment is Not Over 3 Years Old
ARC WELDERS—DRILLS—GRINDERS
SMALL TOOLS—BUDA FORK LIFT
OFFICE EQUIPMENT
TRUCKS—CARS
ELECTRONIC EQUIPMENT

IN ADDITION TO THE ABOVE—THERE IS A TREMENDOUS QUANTITY OF OTHER VALUABLE EQUIPMENT. WRITE TODAY FOR BROCHURE.

From foundry cores to flower pots, Hevi-Duty ovens produce clean, uniform results

It makes no difference "what's in the oven" — all products benefit from the cleanliness and uniformity of performance of Hevi-Duty units. Further, while this uniformity benefits your products, you benefit from Hevi-Duty versatility.

Hevi-Duty offers the largest and most complete line of ovens and other heat processing equipment in the industry. There is a size and type oven to fit your specific requirements, and adapt to your over-all operation.

Why not ask your Hevi-Duty systems engineer to study your operation and recommend the unit that would be most efficient for you. He will be glad to to do it without obligation. There is a Hevi-Duty office near you.

HEVI-DUTY

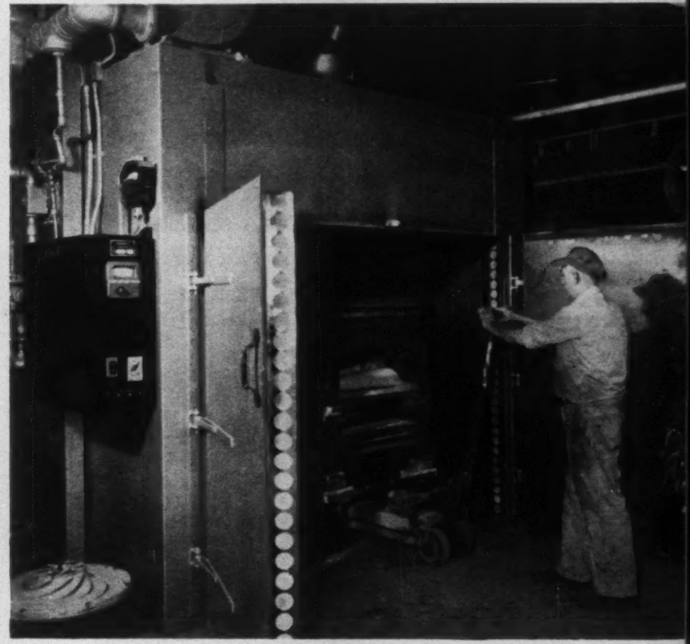
Electric and Fuel-Fired
Industrial Furnaces and Ovens

B P
C

A Division of
Basic Products
Corporation

Hevi-Duty Electric Company, Milwaukee 1, Wis.

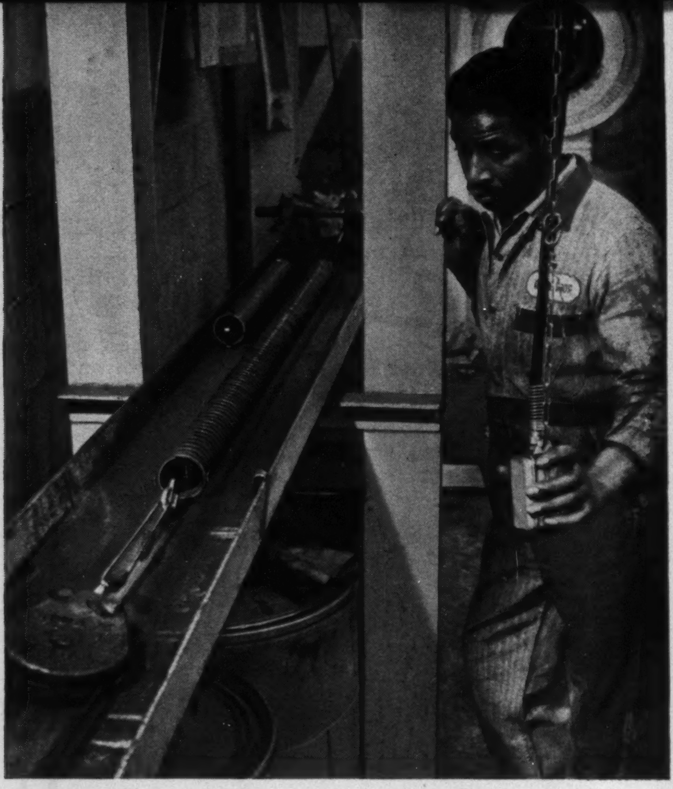
This Hevi-Duty Oven bakes cores for sand casting brass bushings and gears at Bucyrus-Erie Company, South Milwaukee, Wisconsin. The finished parts will be used in the world's largest power shovel. This oven more than matches the output of the unit it replaced, yet it requires only half the floor space. Further, its temperature uniformity and efficient combustion assure clean cores of excellent quality. ***For complete information on this, write for Bulletin 259.***



Stainless Foundry and Engineering, Inc., Milwaukee, Wisconsin, uses this Hevi-Duty oven for drying molds and cores. It operates 24 hours a day, five days a week at 475° F. Its over-all temperature uniformity, excellent circulation of heated air has doubled capacity of the previous unit. Efficient combustion has also resulted in fuel savings, and contributed to the excellence of the finished castings. ***For complete information on this, write for Bulletin 259.***

A unique system of ducts above and below each belt distributes hot air evenly among these three tiers of paper mache flower pots. This oven also dries packaging materials for a large Midwestern container corporation. Built in standard 20-ft increments, it can be expanded to meet any continuous evaporation process by simply adding new sections. ***Please write for Bulletin 159.***

D. C. Forry, sales manager for Ridge Door, left, shows Pittsburgh Steel Salesman Robert Hogan how each spring is tagged, indicating pounds pull to assure that the proper weight garage door is matched with the proper springs.



Testing a 25-inch long extension spring to determine the pounds pull required to extend the spring to 67 inches. Engineering formulas tell workers what weight springs will balance each door. Correct pounds pull is marked on tag which is fastened to spring

How Pittsburgh Steel's Wire Helps A Door Man Keep His Balance

Ridge Door Company Uses Oil Tempered Spring Wire From Pittsburgh Steel Company To Coil Extension And Torsion Springs Which Balance Garage And Industrial Doors Within Five Pounds

It takes an even temper to make a garage door.

For Ridge Door Company of Monmouth Junction, N.J., "even temper" means dependable uniformity in oil-tempered spring wire it gets from Pittsburgh Steel Company.

Garage doors are deceiving. Doors identical in style and size can vary as much as 30 pounds in weight due to the wood's moisture content and other factors. Yet the springs which open and lower doors with mere finger-tip pressure must be in near perfect balance.

Uniformity of Pittsburgh Steel's oil-tempered spring wire enables Ridge Door, a division of Muskegon Motor Specialties Company, to match individual doors to springs whose pull is within five pounds of the door's weight. Here's that story:

The matching process begins with completion of the wooden door, made of high altitude, kiln-dried hemlock or Douglas fir. Each finished door is weighed carefully and tagged to show its weight.

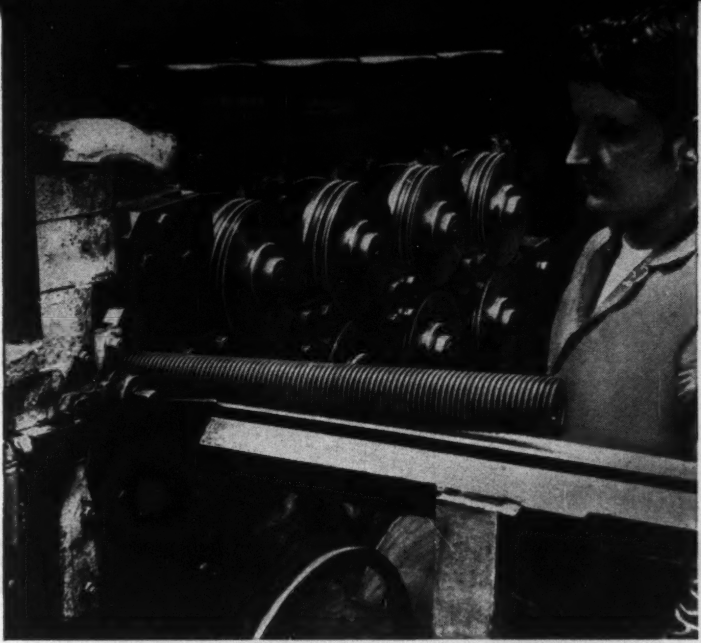
Meanwhile in the Spring Department springs are being coiled according to engineering formulas which take into account door weights, drum diameters and other factors. After coiling, each extension spring is tested to determine the number of pounds pull required by extending it a specified number of inches. This pull is machine stamped on a tag which is fastened to the tested spring.

For example, a 25-inch spring is extended to 67 inches and the pounds pull is automatically recorded.

Engineering formulas tell the workers what weight springs to match with different doors. As a result, Ridge Door is able to assure its customers that doors will be in balance within five pounds.

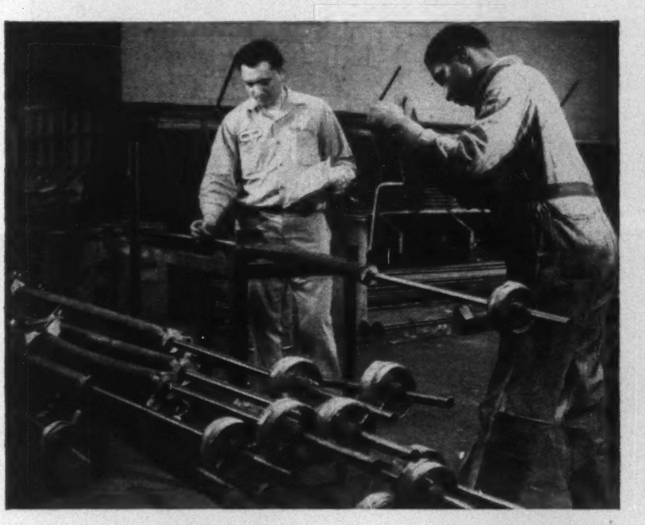
Uniformity of oil tempered spring wire makes this precision work possible. Springs coiled from Pittsburgh Steel wire can be depended on for consistent performance.

Coiling up to five tons of springs a day provides a tough test which

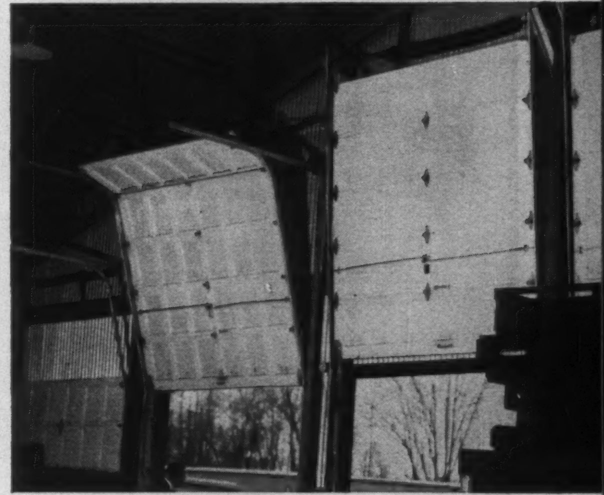


Uniform diameters and freedom from hard and soft spots speed spring coiling in the Monmouth Junction, N.J., plant of the Ridge Door Co. Division of Muskegon Motor Specialties Co. Pittsburgh Steel Co.'s oil tempered spring wire helps Ridge Door match springs to doors so precisely that finished product is in near perfect balance.

After coiling, springs are loaded into a two-unit, gas-fired furnace for heat treating. Springs are stress relieved for an average of 45 minutes at 475 degrees F. to achieve desired physical characteristics.



Assembling torsion springs on shaft. Each of these shafts will get two springs for use in raising a 16 by 7-foot double garage door. The springs shown here are coiled from wire .263 inch in diameter. The finished springs each have 120 coils. Drums and cables already are assembled.



A combination of high lift and vertical lift industrial doors produced with springs coiled from Pittsburgh Steel Co. wire is shown here. The installation is in the New Brunswick, N. J., warehouse of the Herman Forwarding Co.

Pittsburgh Steel wire passes.

Carmen Pellino, foreman of the Spring Department, puts it this way:

"We must have wire with uniform diameters, free from kinks as well as hard and soft spots.

"Variations in diameter prevent proper coiling since the wire will not pass through the rolls on the coiling machines properly. Soft and hard spots produce uneven coils and affect spring performance. We have found springs coiled from Pittsburgh Steel wire coil without trouble and perform well in service."

Other users of the wide range of wires for industry produced by Pittsburgh Steel get similar advantages. For improved production and greater customer satisfaction, call one of the district offices listed below. Real help is as close as your phone.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

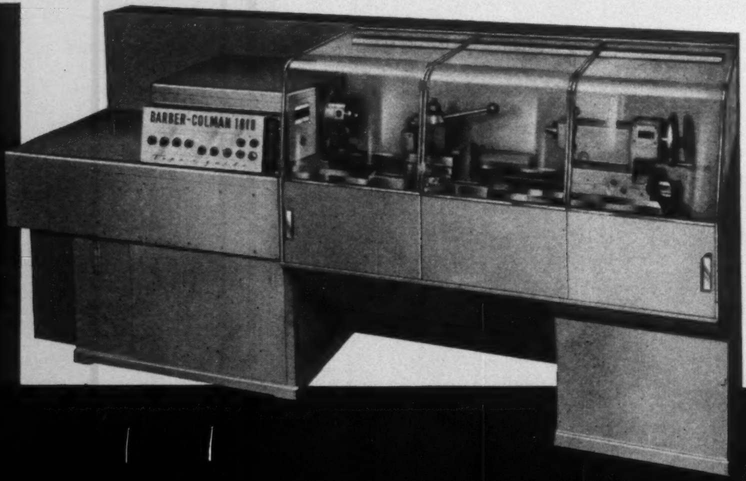
Atlanta	Cleveland	Detroit	Los Angeles	Pittsburgh
Chicago	Dayton	Houston	New York	Tulsa
			Philadelphia	Warren, Ohio

Precision lathes for tape, tracer, or operator control

Here you see the core of the new Barber-Colman lathe line. To prove the *new* ideas claim, take just two examples, the Tape-r-guide (directly below) and the 1610 tracer lathe (lower right, opposite page).

News about the Tape-r-guide? Without complex electronics, with just electromechanical controls, this machine can do cutoff and boring as well as internal and external step-turning, smooth tapers, and even some radii. Simplicity itself, it does its work with a single-point tool . . .

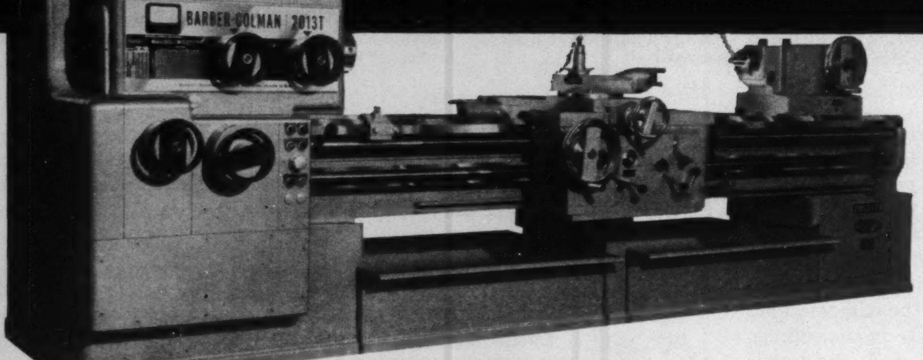
The new ideas in turning



new

NEW Tape-r-guide (16" and 20"), first basically mechanical lathe with fully integrated 8-channel binary code control system. Automatically performs stop-start, positioning, speed adjustment, and feed change functions; machines all practical tapers without "hunting" or step formation; produces simple radii; cuts chamfers without special tools; performs cutoff and boring operations and machines at 90° to the work axis — all without feedback or complex electronics. Low capital equipment investment — simple, low-cost operation and maintenance.

NEW 2013, 36-speed lathe (21" and 25") — All-new, geared-head precision lathe for high-speed production or toolroom turning . . . used in production shops with throw-away insert tools at speeds up to 750 sfpm. For fast, accurate production of medium- and short-run jobs. Spindle speeds to 1500 rpm (200 rpm optional); 66 thread cutting and feed changes; 400-lb, two-speed tailstock; separate lead screw and feed shaft. More rigidity, more threading features, more accuracy, more design refinements — more lathe per dollar.



new

completely controlled by the tape. And about the 1610 tracer? This is the "specialist," a concept which for the first time strips off the toolroom equipment and offers a facing and turning lathe that is frankly a production tool. Tracer control multiplies its productivity by making it semiautomatic.

Both these new machines are innovations, and are signs of the unencumbered thinking that goes on at Barber-Colman. It is part of the heritage that has brought to Barber-Colman precision lathes such important design advantages as sealed gearboxes, controls that are simplified and grouped, hardened and ground bedways, the use of precision antifriction bearings, and universal automatic lubrication.

You can continue to expect significant design contributions such as these in the lathes Barber-Colman will build in the years to come. But meantime, take advantage of the increased productivity of the machines offered today.

A good way to start is to call your Barber-Colman representative.

Barber-Colman Company

BARBER
COLMAN

1010 Loomis St., Rockford, Illinois

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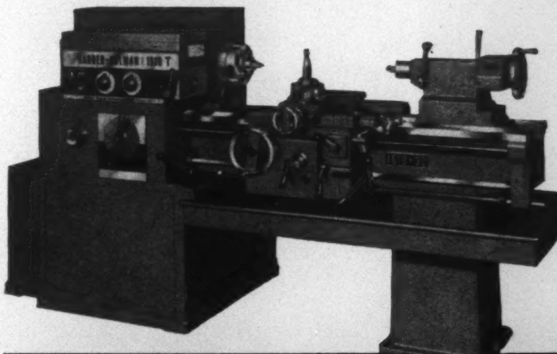
are from Barber-Colman



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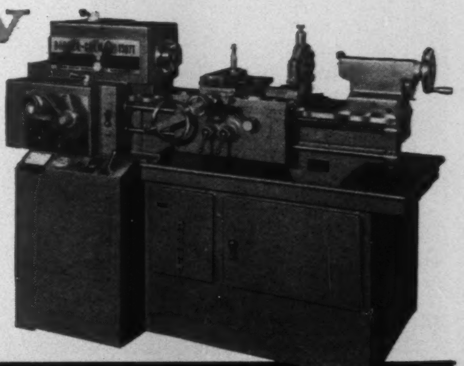


NEW 1610T toolroom lathe (16½" and 20") — The lathe with the "toolroom touch." The minute you push the start button and grab the handwheel, you feel the difference toolmakers look for. Try the speed change dial for fast facing or a light finishing cut on the OD. Smooth, silent, fast acceleration under load — infinitely variable speeds to 1500 rpm in the high range.

NEW 1610 specialist (16½" and 20") — Proven new concept reduces both capital equipment and operating costs. For high-speed turning, facing, and boring. Class B operators readily become proficient at producing accurate nonthreaded parts up to 100% faster. Infinitely variable spindle speeds to 1500 rpm; infinitely variable power feed to both carriage and cross slide; five-position turret-type longitudinal feed stop — reduces skill requirements and speeds operation.

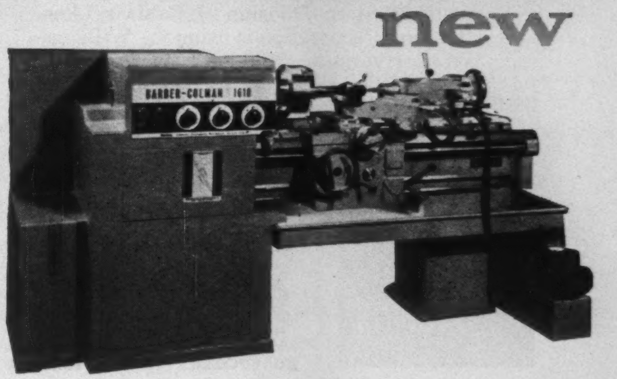
NEW 1307T toolroom lathe (13") — High capacity and timesaving controls combined with super precision. Infinitely variable speeds to 3000 rpm in belt drive can be changed under load. Combines extra capacities (13" swing and 24" between centers) with extra quality: selected Class ABEC-7 super-precision spindle bearings; ground-from-the-solid actuating screws; antifriction bearings on all shafts; Meehanite castings; hardened-and-ground headstock gears; splined shaft connections.

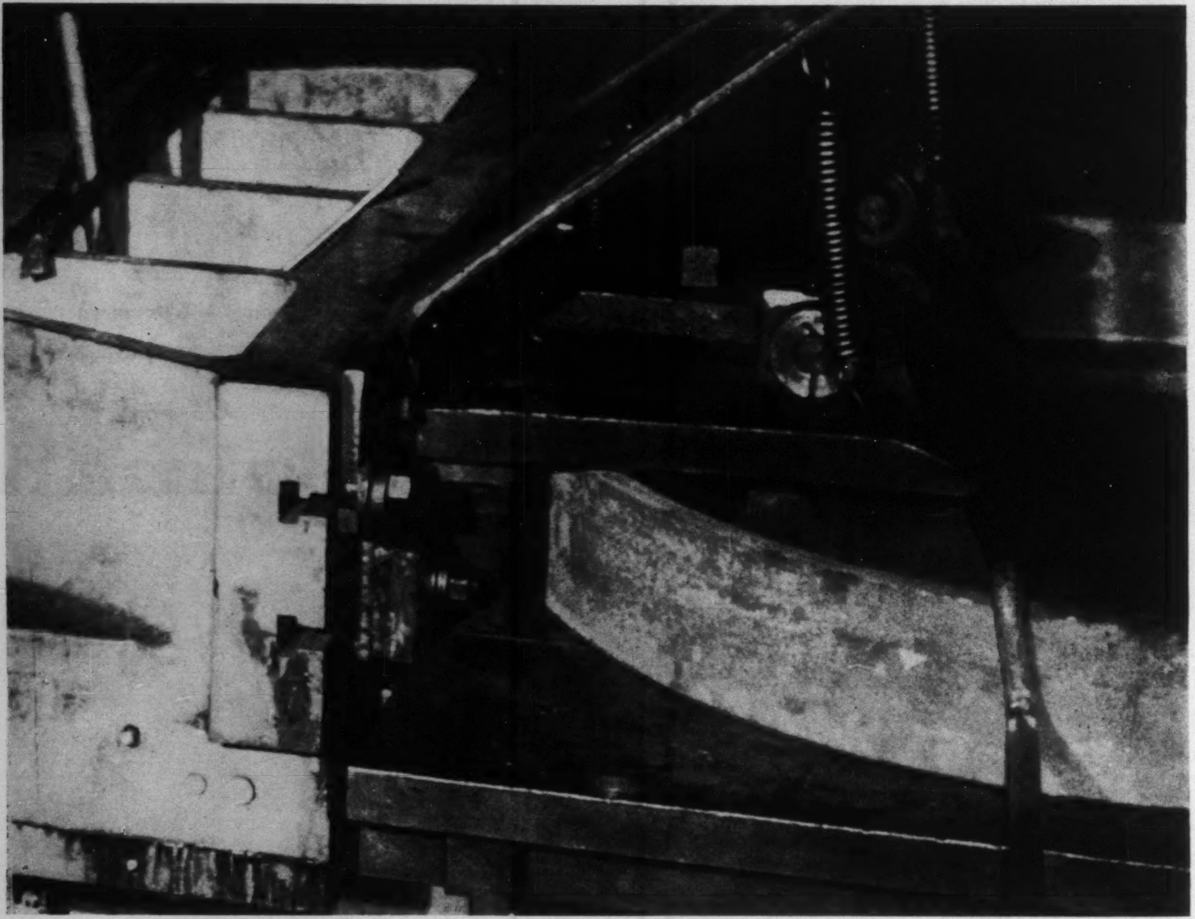
NEW 1610 tracer lathe (and 1610-13) — Can be purchased with hydraulic tracer for about the same price as a toolroom lathe of the same rated capacity and quality. Real cost-busting combination of "specialist" lathe and tracer control capable of holding diameters within 0.001".

BARBER-COLMAN 1610

new

new





Williams-White 250-ton Hydraulic Bulldozer forming circle ring for Austin-Western power grader.

Austin-Western throws a perfect curve with a 250-ton W-W "arm"

Job: Form a perfect circle from a 184" long hot rolled angle stock, 6" x 8" x 1¼".

A ring forming die in a 250-ton Williams-White Hydraulic Bulldozer puts the curve into this heavy workpiece as it comes cherry red from a nearby furnace. A simple hand control provides precision ram movement. Austin-Western Division of Baldwin-Lima-Hamilton Corporation is using the Williams-White Hydraulic Bulldozer to make 62" O. D. circle rings for its famous line of power graders.

Williams-White strength and design team up with Austin-Western tooling skill to get a big job done fast and easily. For details on Williams-White Hydraulic Bulldozers 50 to 500 tons, *write for free Bulletin 73.*

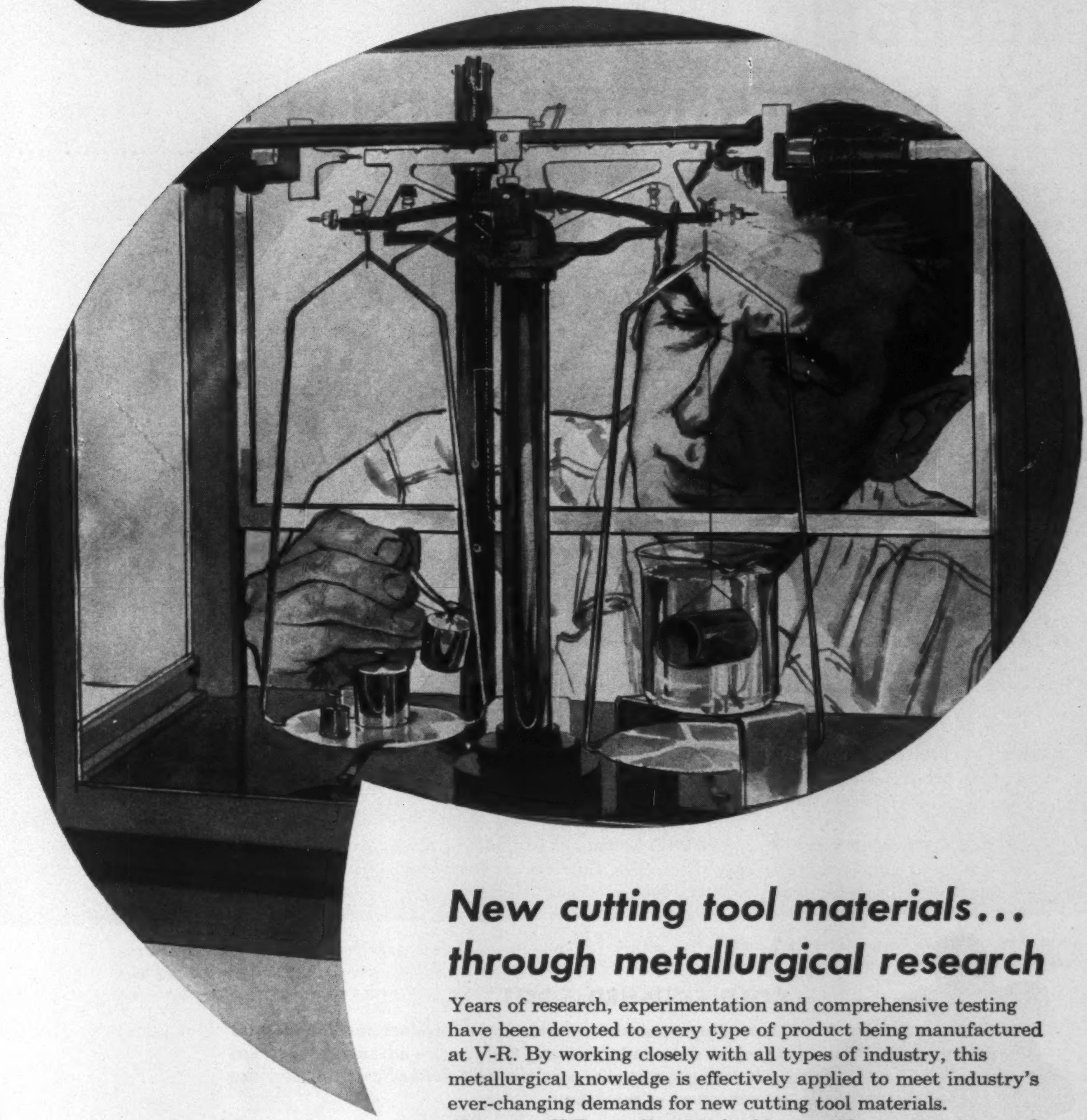
107th year

WILLIAMS-WHITE & CO 600 Third Avenue, Moline, Ill.

the measure of Performance Reliability for more than a century

BULLDOZERS • PRESSES • SHEARS • BENDERS • PUNCHES • HAMMERS

V-R CREATING THE METALS THAT SHAPE THE FUTURE



New cutting tool materials . . . through metallurgical research

Years of research, experimentation and comprehensive testing have been devoted to every type of product being manufactured at V-R. By working closely with all types of industry, this metallurgical knowledge is effectively applied to meet industry's ever-changing demands for new cutting tool materials.
Above is a V-R metallurgist checking specific gravity of a metal sample on an ultrasensitive scale. Research, such as this, provides the basis for developing new cutting tool materials; for example, VR-65, a new titanium cemented carbide grade, for ultra high speed machining on *all* types of steel.

For a complete catalog
of V-R quality products write:

V-R **VASCOLOY-RAMET**
834 MARKET STREET • WAUKEGAN, ILLINOIS

C-790

REPUBLIC COLD EXTRUSION QUALITY STEEL

. . . steel that cuts your cost of production

Republic Steel—largest producer of the nation's widest range of bar products—has a new, 11″ bar mill in Chicago that specializes in steel for cold extrusion and cold heading. Features that save you money:

1. **UNIFORM FLOW CHARACTERISTICS**—carbon and alloy steels produced on this mill have denser, more uniform structures because they undergo more hot work. Bigger than usual billets, 3″ and 4″ square, become finished products of standard size.

2. **PRECISE DIMENSIONAL ACCURACY**—16 alternating vertical and horizontal stands with roll neck bearings are utilized to exert uniform pressure on all sides of the bar. This process, along with vertical looping above the mill, eliminates deformations.

3. **ANNEALED, NORMALIZED, SPHEROIDIZED**—new continuous annealing furnaces, capable of all types of furnace treatments, are designed for rigid control of speeds, temperatures, and atmospheres. Other facilities are available to pickle, oil, lime, phosphate, and borax coat bar products.

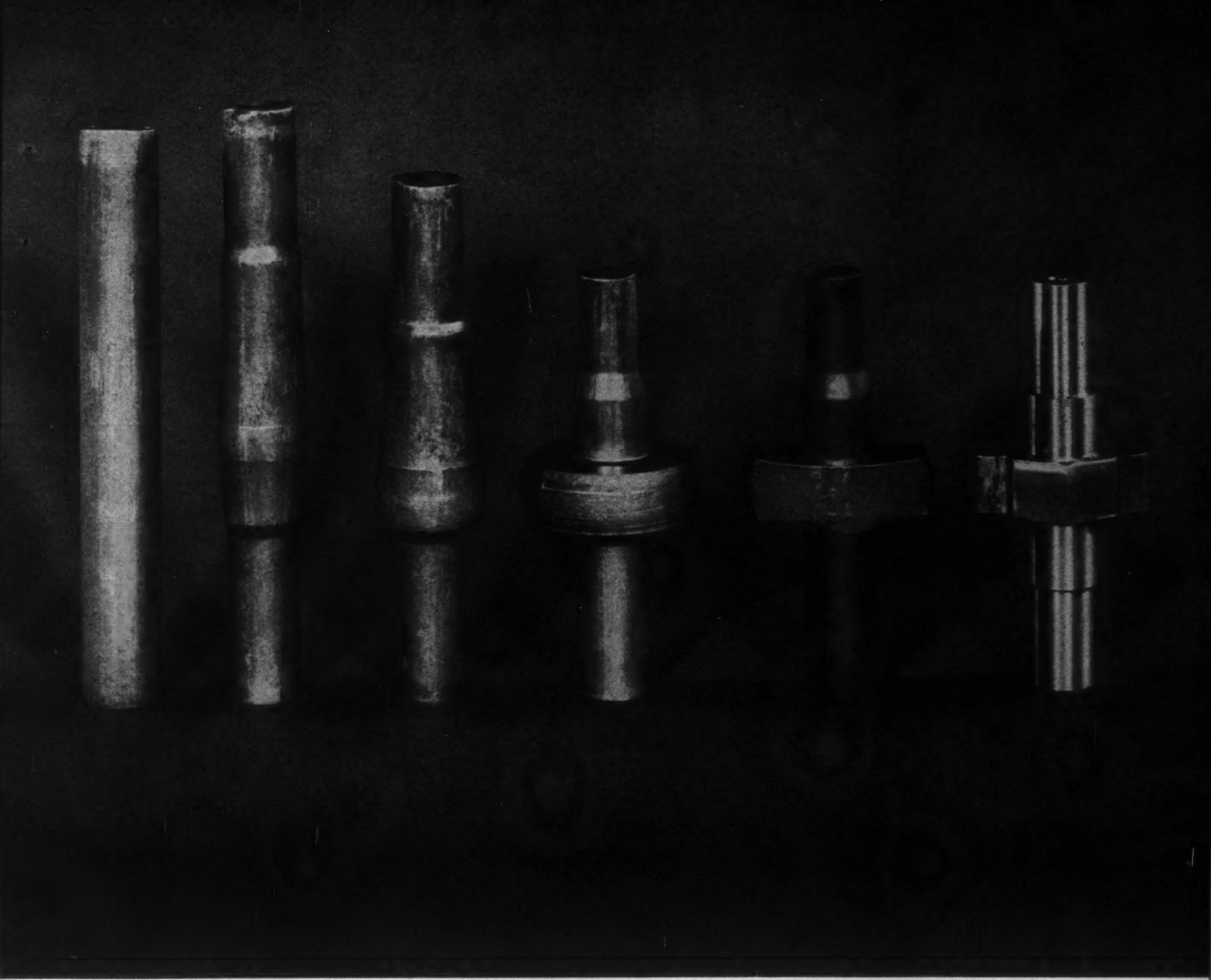
4. **1600-POUND, DOUBLE-BANDED COILS**—four high-speed coilers handle the complete range of coils produced (⅜″ to 39/64″—700 to 900 pounds, ⅝″ to 1½″—1400 to 1600 pounds). Bigger coils cut downtime and scrap loss. Double banding simplifies your handling.

5. **CAPACITY TO MEET YOUR REQUIREMENTS**—this 11″ bar mill produces bar products at rates of up to 3000 feet per minute. Annealing furnaces are the continuous type, capable of meeting the growing demand for furnace-processed steel.

COLD FINISHED, TOO!

Depending upon the nature of your product and the method by which it is made, you may find it more advantageous to use cold extrusion quality steel in *cold finished form,* as did the manufacturer of this gear.

We would welcome an opportunity to serve you on your requirements for both hot rolled and cold finished, cold extrusion quality steel. Our metallurgists will help you select the most economical carbon, alloy, or stainless steel capable of meeting your requirements. For complete data, call your nearest Republic sales office or mail the coupon.



CUTTING THE COST OF A SEGMENT GEAR: ideal blanks are produced by cold heading, cold extrusion, and upsetting. Stock with upset in the center is hot trimmed on a press, after which it is machined into the finished part. Only a minimum of stock need be removed during final machining. Photo courtesy of National Machinery Company, Tiffin, Ohio.

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World's Widest Range of Standard Steels and Steel Products

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Send more information on cold extrusion and cold heading quality steel.

☐ Hot Rolled ☐ Cold Finished

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Company________________________

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PRECISE
TUBING
HELPED
MAKE THIS
TEST
POSSIBLE

That's a test pilot undergoing several "G's" in one of those human centrifuges. His life and the progress of future generations depend on the performance of many tubular parts built to rigid specifications, tight tolerances.

We make stainless steel and nickel tubing in mechanical, aircraft, capillary and hypodermic grades in sizes up to 1 inch OD—plus an amazing variety of "specialties" such as super and "exotic" alloys, glass-to-metal sealing alloys and clad metals.

In addition, we produce a vast line of platinum products and chemicals that have been used by industry for over a century.

We are unique because of our ability to *work these metals to such tiny, precise forms.* Bulletin No. 12 describes our tubular products—Catalog No. 5 describes our platinum products. Write for them.

BISHOP

Tubular Products Division **J. BISHOP & CO.** *platinum works* 35 KING STREET, MALVERN, PENNA.

A JOHNSON MATTHEY ASSOCIATE "METALS FOR PRECISION AND PERFORMANCE"

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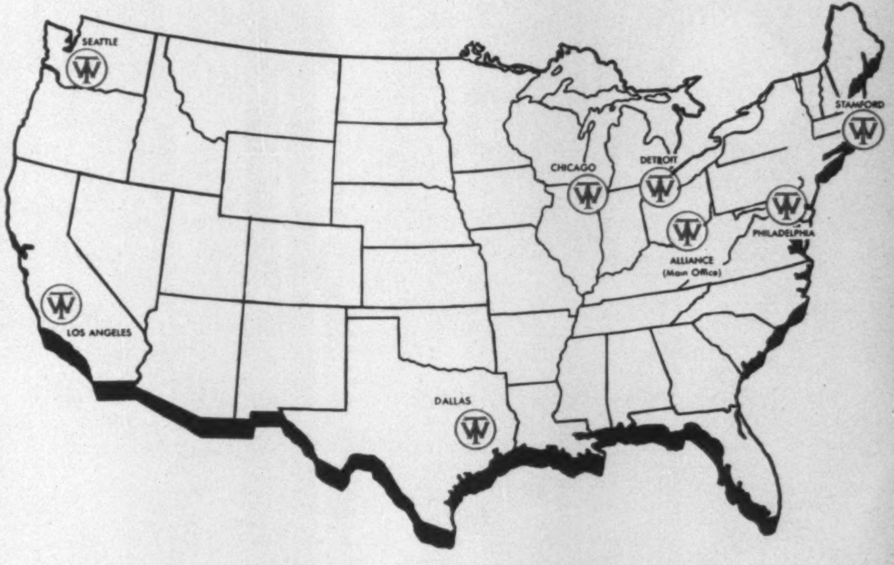


T & W SERVES YOU

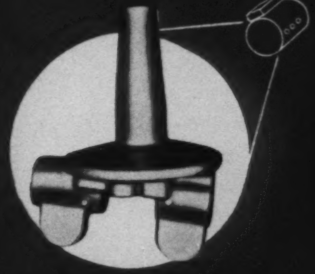
You do not have to be in any special area of the country, to obtain the benefit of T & W's wide range facilities. Our sales engineers are located in every major industrial region, because T & W's experience and facilities have such broad range that we serve all American industry. Wide range in plant facilities, in experience, in service, means that you get more from T & W.

SALES OFFICES: PHILADELPHIA • STAMFORD (OLD SAYBROOK, CONN.)
CHICAGO • DETROIT • DALLAS • LOS ANGELES • SEATTLE

SPOTLIGHTING HOW T & W'S WIDE RANGE FACILITIES HELP INDUSTRY:

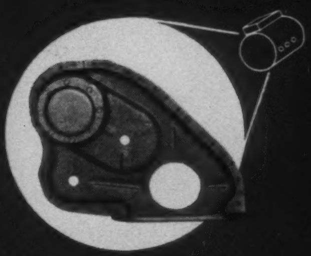
★

STEERING SPINDLE FORGING



Intricate, vital in its function, this forging must be strong and reliable. Metallurgical laboratory, die designer, hammerman all contribute to the T & W Technique which makes it successful.

STAMPED GEAR COVER



A welded assembly of both stamping and forging for a design of maximum strength. Part is 11 gauge and measures 17½" wide, 12¾" high and is 1¼" deep.

WRITE FOR COMPLETE INFORMATION

To find out how you can benefit from T & W's help, write for the 20 page booklet "Transue & Williams Challenges the Future."

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FORGINGS
& DEEP DRAWN
STAMPINGS

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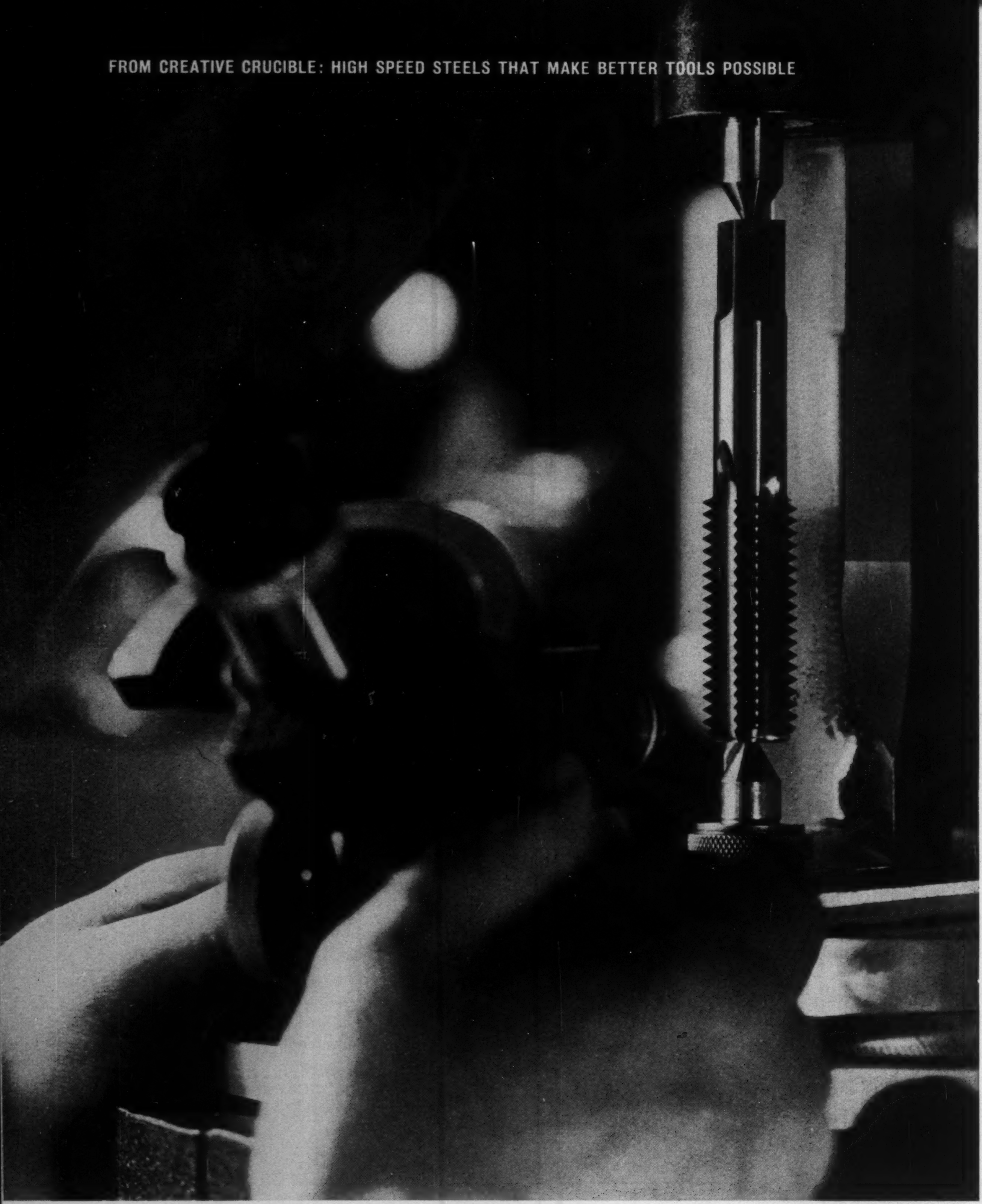
FROM CREATIVE CRUCIBLE: HIGH SPEED STEELS THAT MAKE BETTER TOOLS POSSIBLE



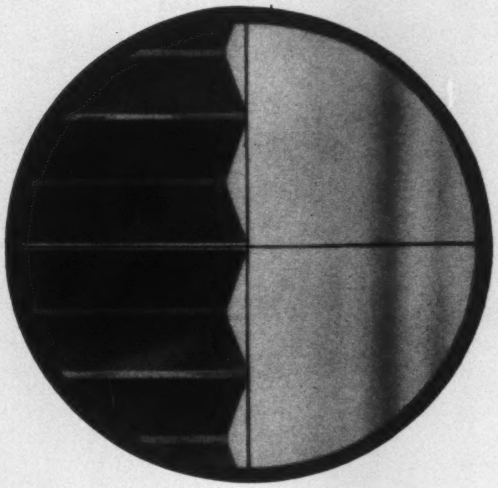
AN INSPECTOR CHECKS A "BOTTOMING" TAP for accuracy of the rake of the cutting face. Rex High Speed Steels help tapmakers produce the clean, accurate cutting edges so vitally needed in today's taps.

TODAY'S TRUE-RUNNING TAPS "TIGHTEN-UP" TOLERANCES

They produce more accurate threads—for closer fits —because of continually-improved Rex® High Speed Steels

The ground-thread taps you now use produce more accurate threads—*and last longer*—even when tapping tough abrasive materials or today's high-strength alloys.

There's a story behind this development of more accurate and productive taps. It's the story of the tapmakers' continuing research and increasing skill—combined with Crucible progress in making better high speed steels.

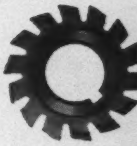


THE RAKE ANGLE of a ¾-10 H5 "bottoming" tap looks like this — when viewed through the rake measuring instrument shown at left.

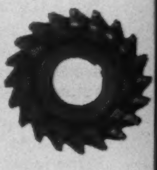
To produce the fine steels needed for taps, Crucible tool steel specialists now use the most advanced electronic instrumentation available. For example: they can record the temperature of the molten metal in the melting furnace within 5 seconds. So, each heat is produced under identical temperature conditions.

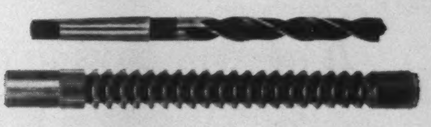
Crucible specialists employ new techniques that also greatly improve deoxidation of the liquid steel. They use new ingot mold designs to minimize segregation. And they ultrasonically inspect every billet of Rex High Speed Steel before rolling or forging to ensure freedom from internal voids, flake, inclusions, etc.

For complete information on how Rex High Speed Steels can help make precision tools better, call or write Crucible branch office or service center near you.



BETTER TOOLS, THROUGH BETTER STEELS. The constant improvement of Rex High Speed Steels ensures the increasingly better performance of hobs, broaches, twist drills, cutters and taps.





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KEMP LEAD MELTING POTS *give you 5 exclusive advantages!*

Where speed plus top control counts, you can count on Kemp Immersion Heaters to give you accurate heat control in annealing, tempering, lead and tin melting and many other applications. Here's why:

1 Only Kemp Immersion Heaters are equipped with the exclusive Kemp Carburetor that pre-mixes air and gases. This means lower labor costs . . . more complete control . . . much faster starting.

2 Only Kemp puts the heat where it belongs—next to the material to be melted. Only Kemp uses recirculation heat tubes to transfer heat from the gases to the melt. Overruns and lags are virtually eliminated.

3 Only Kemp eliminates exposed flames, hazards to workers, equipment and plant. Burner is enclosed in heating tube.

4 Only Kemp assures you of no cracked pots at any time. Kemp pots are designed with a safety factor above the level of controlled heat.

5 Only Kemp gives you accurate temperature control at all times. Set the Kemp unit and forget about it. Kemp's exclusive heater design assures your melt will always, automatically, be uniform.

See the man from Kemp if you're in need of reliable immersion heater equipment. Write today for Bulletin IE-11 or call your local Kemp representative.

It always pays to come to

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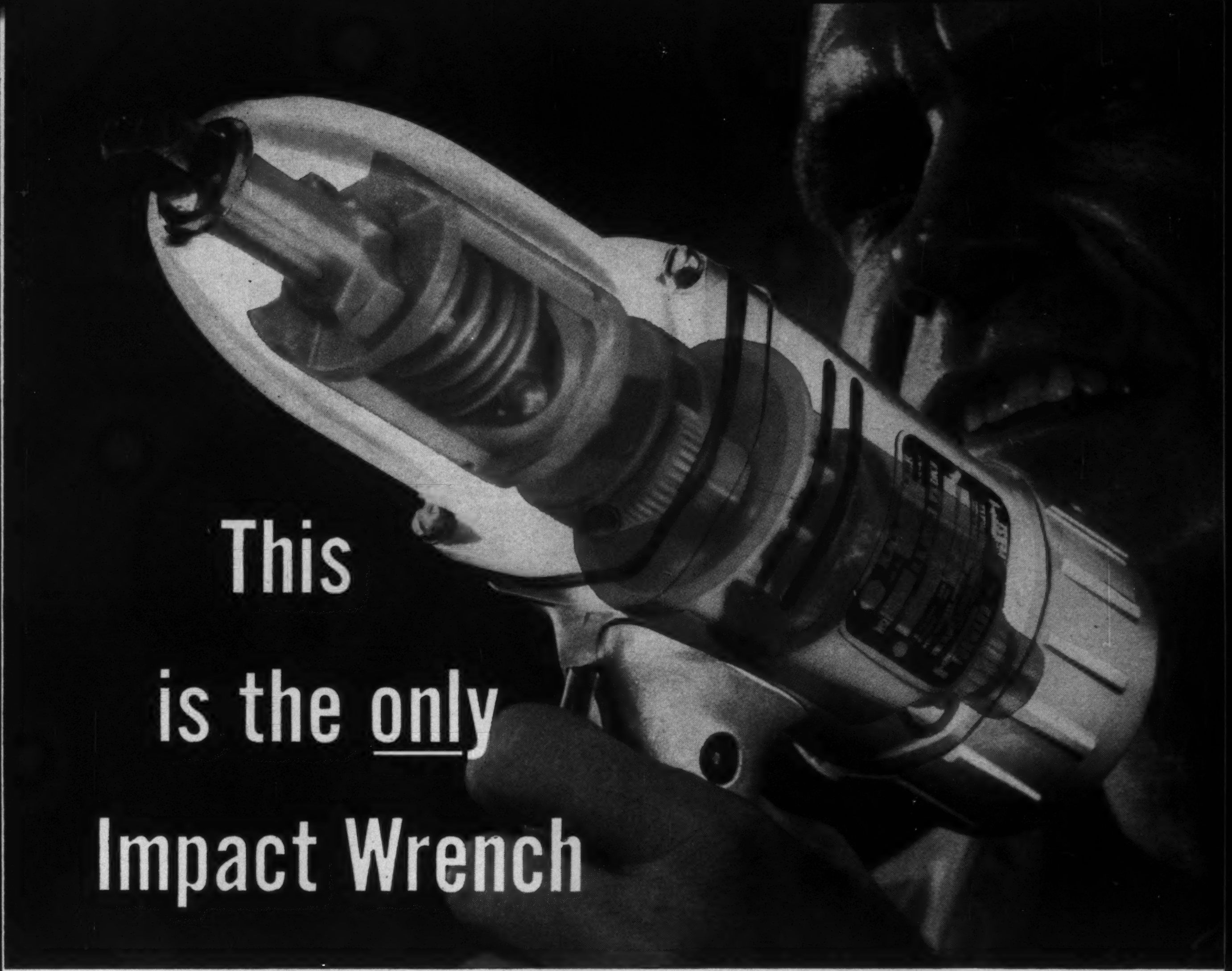


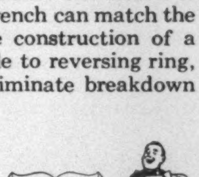
that has the GUTS to prove its maintenance costs peanuts!

Take an Impact Wrench that's built with extra ruggedness clear through. Take a Factory Service Branch network that keeps accurate repair records. Result: *proof positive* that Black & Decker Impact Wrenches have a phenomenally low maintenance cost.

No other Impact Wrench approaches the Black & Decker because no other Impact Wrench can match the power, speed and maintenance-free construction of a Black & Decker. From drive spindle to reversing ring, every part has been designed to eliminate breakdown problems.

Wherever a bolt, nut, wood or lag screw must be spun, or drilling and tapping done—in machinery moving, installation work, general maintenance or production—a B&D Impact Wrench will do the job faster, with less fatigue, and at lower cost. Mail the coupon or call your B&D distributor for a demonstration.

Leading Distributors
Everywhere Sell



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Quality Electric Tools

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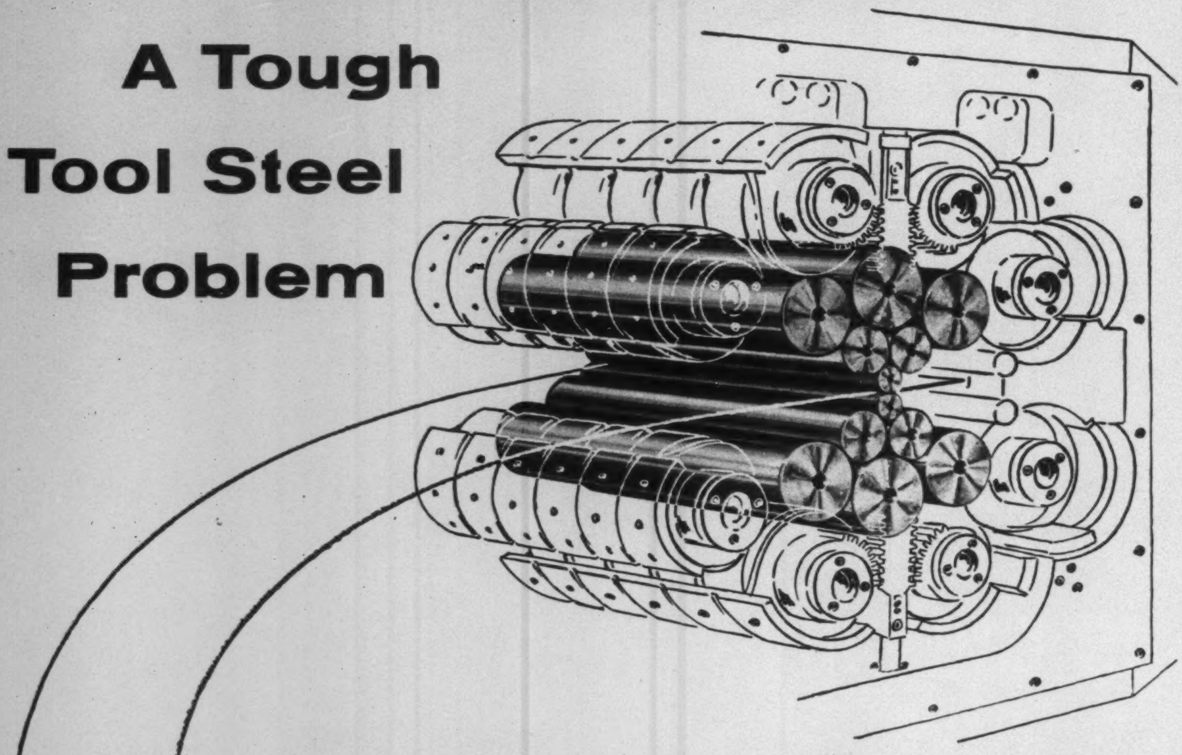
How UDDEHOLM Solved A Tough Tool Steel Problem



Sendzimir Mill Work Rolls, to impart that high finish to cold-rolled material, must, themselves, have an extremely fine surface finish.

The Problem—Produce a "clean" steel for high pressure and high speed cold rolling application.

The Solution—UHB "Tri-Z", a high carbon, high chromium steel with an absolute minimum of non-metallic inclusions.

Uddeholm metallurgists solved the problem by starting with the purest Swedish ores, having very low sulphur and phosphorous content. Then, they used extreme care in refining, a special pouring technique and quality controls to the highest standards. Because of its "cleanness", its ability to take an exceptionally high finish and stand up under high pressure and high rolling speed, "Tri-Z" is the criterion for Sendzimir Mill Rolls.

All Uddeholm Tool Steels, whether for standard or unusual applications, adhere to the same high quality standards. You can choose from more than 2800 combinations of grade, shape, size and finish. Contact your nearest Uddeholm Specialty Steel Service Center—Newington, Conn., New York City, Cleveland, and Los Angeles, where experienced "steel men" will help you select the right tool steel for your needs. At Uddeholm you have an unbeatable combination for quality and delivery.

Write or call on Uddeholm for your tool steel needs.

UHB

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COLD ROLLED SPRING STEELS

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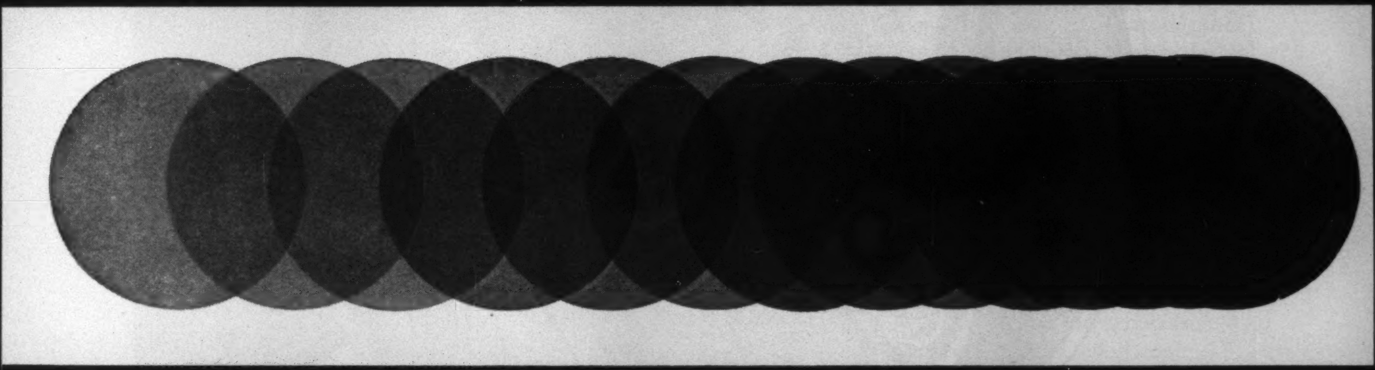
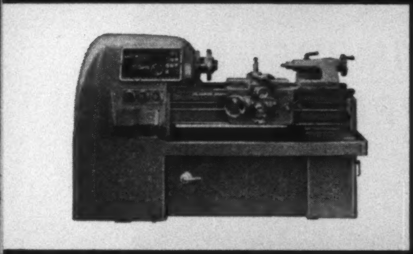
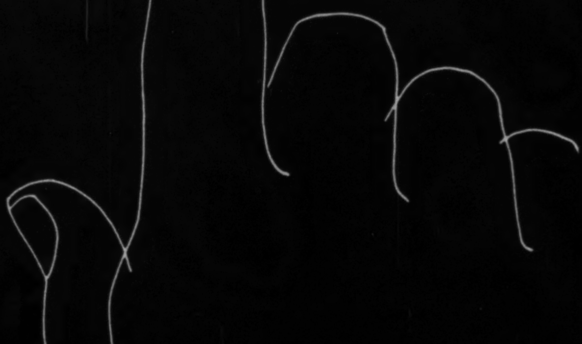
Infinitely Variable Spindle Speeds!







new proven design

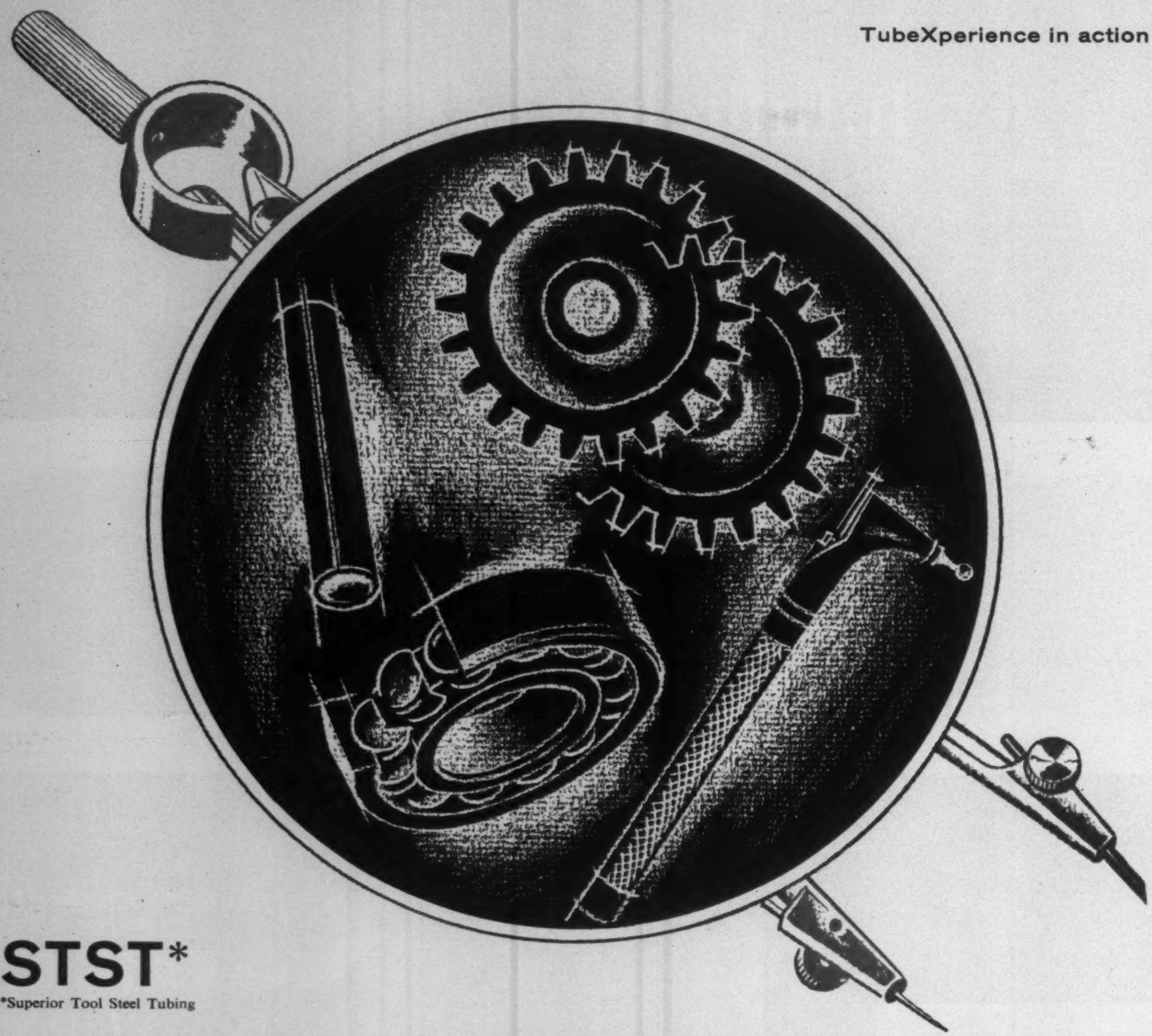
NēBEL MICRO-TURN*

HIGH-SPEED PRECISION LATHE

Here is the ultimate in turning efficiency and convenience. Simply push a button until the spindle speed you desire indicates on the tachometer. A continuously variable range of spindle speeds from 43 to 3500 RPM is provided by a highly efficient, proven mechanical speed variator belt-less type drive unit . . . with full motor horsepower (3 or 5 HP) throughout the entire range and speed constant within .2%. But this is just one of the revolutionary features of the Nebel MICRO-TURN. Write today for your copy of the complete story on the new MICRO-TURN Lathe, described in Bulletin No. 219. Nebel Machine Tool Corporation, Lathe Division, 3415 Central Parkway, Cincinnati 25, Ohio.

*TM

TubeXperience in action



STST*

*Superior Tool Steel Tubing

ODDS: 1000 TO 1 TO CUT COSTS, IMPROVE PERFORMANCE IN 1001 DIFFERENT APPLICATIONS

Superior tool steel tubing is an excellent material for tools, but equally good for 1001 other applications. Odds are that it will cut costs and improve performance wherever it is used. Type E-52100, an oil hardening grade of high-carbon and chromium alloy steel, has been widely used for such diverse applications as thread guides on hosiery knitting machines, nylon yarn guides, ball bearing races, nozzles for blast cleaning equipment, gear and pinion parts, dental instruments and extrusion mandrels. Type E-1095, a high-carbon steel tubing, is serving as applicators for jewelers' oilers, leather and paper punches, and surgical instruments.

Perhaps you have an application that can benefit from high strength and hardness, good wear resistance, abrasion resistance, shock resistance, and notch toughness. In that case, consider Superior tool steel tubing before you go any farther. It could give you a better product at a lower cost. Send for Data Memorandum #14, a handy guide to your thinking. Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

Steel

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All analyses .010 in. to 5/8 in. OD—certain analyses in light walls up to 2½ in. OD

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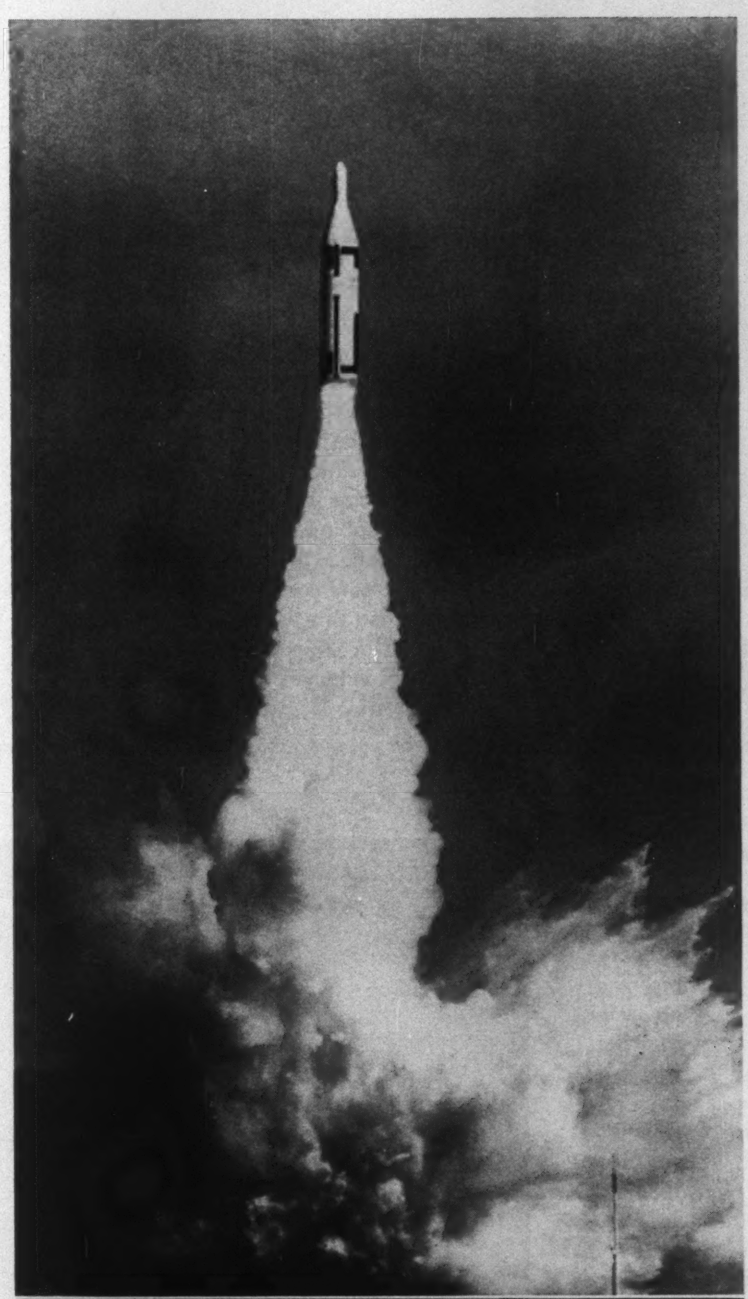

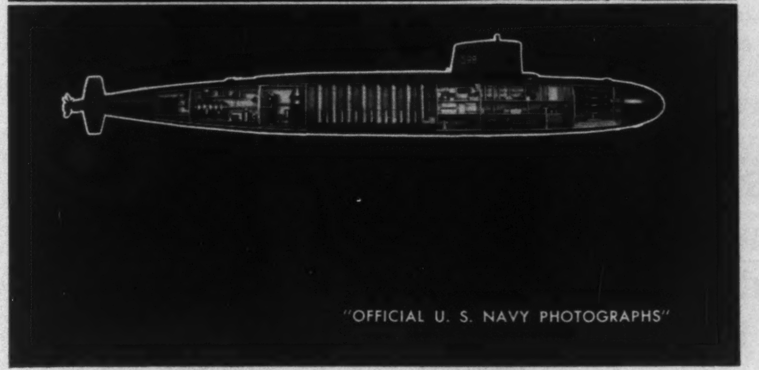

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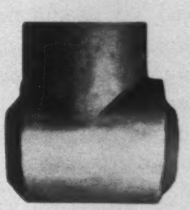
CAMERON HELPS PUSH POLARIS

Nozzles and structural members for Polaris and a number of other important U. S. Missiles are forged by Cameron from molybdenum, titanium, tantalum-tungsten and other exotic metals.

Cameron forged stainless steel check and gate valve bodies are a vital part of the nuclear power plant in submarines of the type which fire Polaris.

Our unique forging processes, which make us a significant supplier of these critical Polaris forgings, afford many distinct advantages in the production of these and many other vital components of the national defense program.



Check Valve for the Hot Loop of Nuclear Propulsion System. These are the largest closed die stainless steel forgings ever produced.

A first stage Polaris Nozzle Liner forged from pure molybdenum.

Cameron

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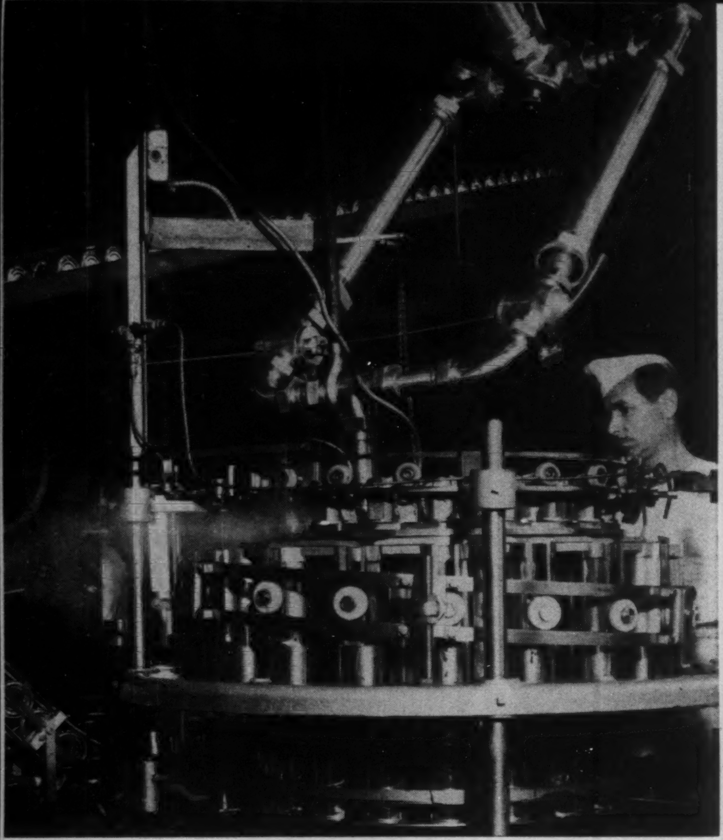
SPECIAL PRODUCTS DIVISION
P. O. Box 1212, Houston 1, Texas



...LIQUID

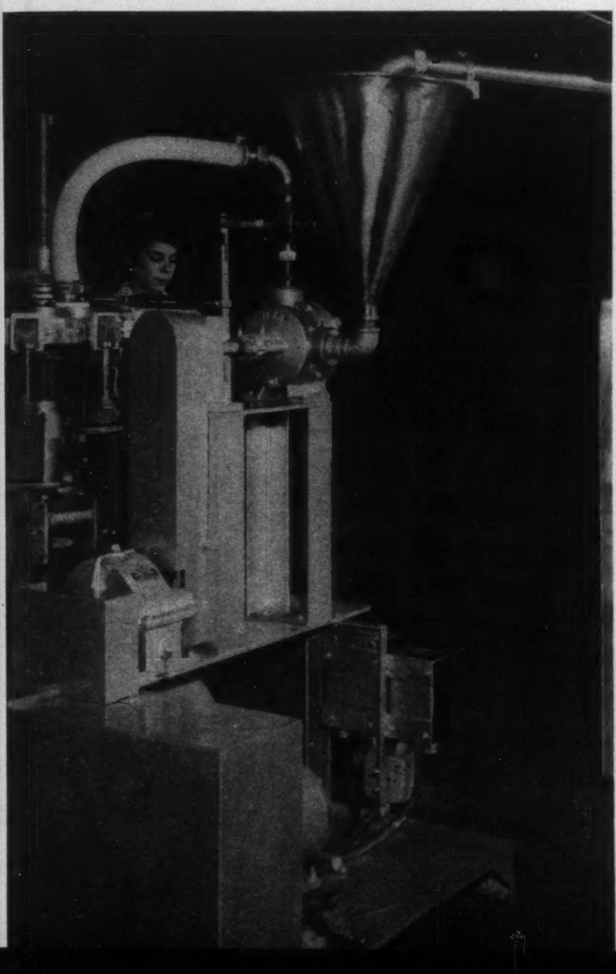
If you make equipment that fills cans with chocolate or consomme, prune juice or pop, equipment made of Stainless Steel will do it fast, dependably, cleanly. The Votator* piston filler shown here happens to be filling cans with chocolate. Made of Stainless Steel, this filler can't harbor germs because Stainless Steel has a smooth, pocket-free surface. It is easily cleaned, too, so the strict standards of cleanliness that are mandatory in any food processing plant are easily maintained. Stainless Steel's resistance to corrosion makes it ideal for liquid applications.

***VOTATOR** *is a registered trademark of the Chemetron Corporation.*

SOLID . . .

If you make equipment that processes solids like peanut butter or shortening, Stainless Steel can make your job easier and more profitable. This system makes peanut butter . . . and it makes it creamier. It takes whole peanuts in one end and grinds them, then Votator equipment heats them, cools them and turns out the finished product, ready for sandwich or cracker, at the other end. Here, Stainless Steel is used in the heads and shaft of the heat transfer area to assure maximum cleanliness. In a sealed unit like this one, corrosion could be a problem so Stainless Steel's inherent corrosion resistance is put to good advantage.

USS **Stainless Steel . . .**
no other metal makes
such a material
difference in
so many applications



This mark tells you a product is made of modern, dependable Steel. Stainless Steel

...and in between

No material can match Stainless Steel's versatility. Stainless Steel offers designers and fabricators a unique combination of properties: superior strength, extraordinary corrosion resistance to an enormous variety of materials, outstanding properties at high temperatures, and attractive appearance. It is easily fabricated, and because Stainless Steel lasts longer, actually costs less in the long run.

For unmatched efficiency, durability, ultimate economy, specify Stainless Steels . . . no other metal makes such a material difference in so many applications.

If you have a selection or delivery problem, ask your USS representative or nearest Steel Service Center.

USS is a registered trademark

USS

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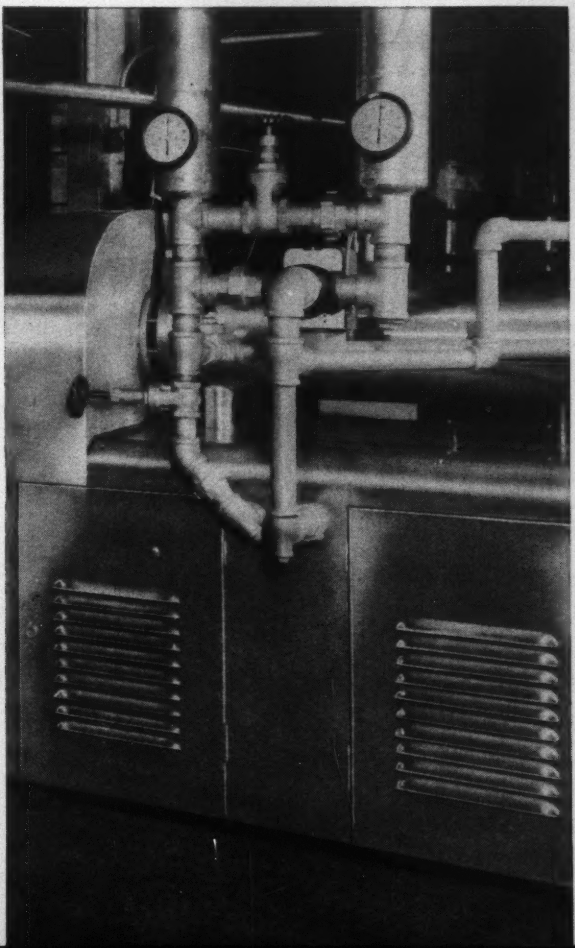

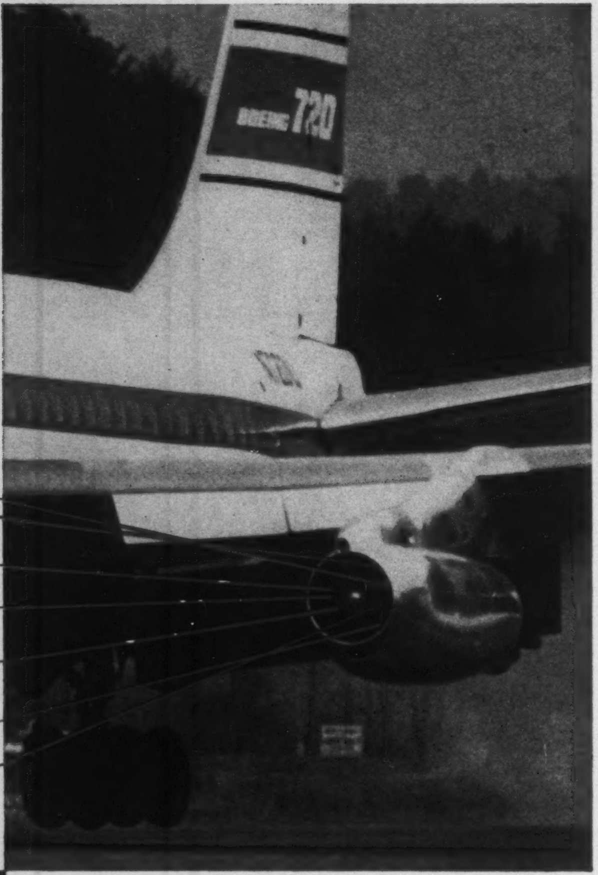

at the touchdown LATROBE'S VAC-ARC® steel goes to work

Thrust reverser bearing assemblies, made of Latrobe's Vac-Arc BG 41 Stainless, take compressive stresses of more than 600,000 psi and temperatures in excess of 800°F. as new Boeing 720 jetliner brakes to a stop. Bearings by Torrington Co.; Thrust Reversers by Rohr Aircraft; Jet Engines by Pratt & Whitney Aircraft.

VAC-ARC BG 41 "hot hardness" withstands critical braking action of new Boeing 720

Through the use of thrust reversers and wheel brakes, the new Boeing 720 has been brought to a full stop within 2200 feet after runway touchdown—bringing high speed jet service to restricted runway facilities throughout the world.

The thrust reverser bearing assemblies, made of Latrobe's new Vac-Arc BG 41 Stainless (modified Type 440 C), withstand the critical stresses at elevated temperatures imposed by the braking action of reversing the jet engine thrust.

Here's another example of Latrobe Metalmasters meeting the challenge for super steels in the jet and missile age. Vac-Arc Steels (consumable electrode vacuum melted) continue to set new standards for cleanliness, homogeneity and high strength.

Do *you* have a high temperature-high strength specification problem? Call Latrobe!

Skillfully made in U. S. A. by

LATROBE
Metalmasters

LATROBE STEEL COMPANY

LATROBE, PENNSYLVANIA

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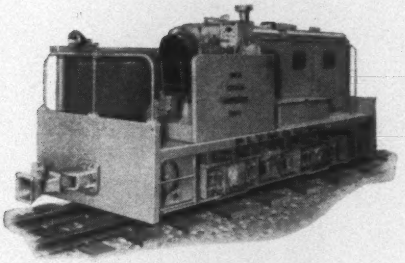
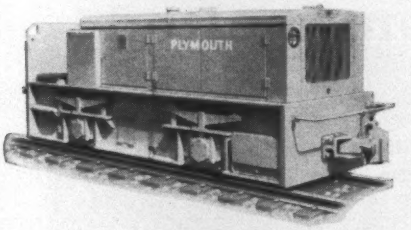
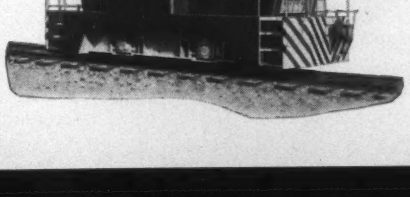


J SERIES Mine-O-Motive, 15 to 25 tons. Diesel powered with exhaust conditioner, Torqomotive Drive. Approved under Schedule #24.



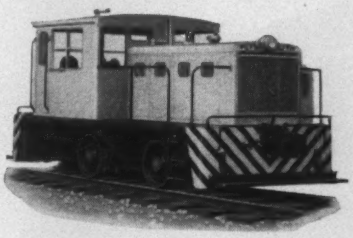
DMS SERIES Mine-O-Motive, 8, 10 or 12 tons. Diesel powered with shaft drive to both axles, full power shifting. Approved under Schedule #24.

CR SERIES, 40 to 60 tons. Diesel powered with shaft drive to both axles, full power shifting, Torqomotive Drive. Speeds to 35 MPH.

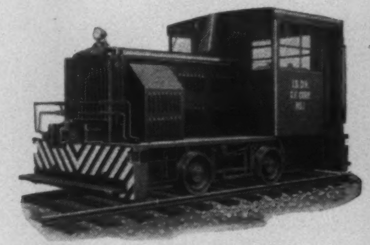


Industry's Smoothest Switchers

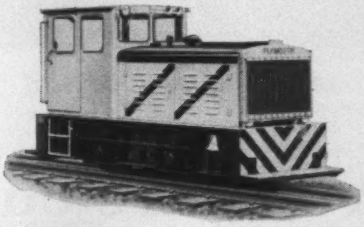
SINCE 1914 Plymouth Locomotives have been used for heavy hauling and switching jobs. They have proven themselves in year after year service with rock bottom economy, maximum availability, minimum down time. Pictured above is the new WDT Cab-in-front model, 40 tons, in service hauling pulpwood. Both the MDT and WDT are available in this model or in the standard models shown below.



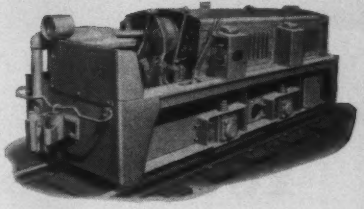
M SERIES, 25, 30, 35 or 40 tons, Diesel or gasoline, mechanical or Torqomotive Drive. This is the standard model, rear cab.



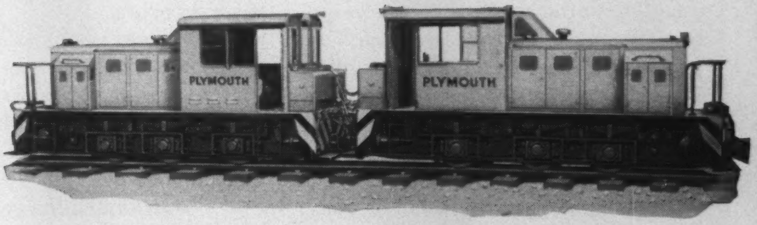
J SERIES, 12, 14, 16, 18 or 20 tons, Diesel or gasoline, mechanical or Torqomotive Drive. Available on 4 or 6 wheels.



D SERIES, 8, 10 or 12 tons, Diesel or gasoline, mechanical or Torqomotive Drive. Cast or Welded Frame.



F SERIES, 5, 6, or 7 tons, available as mine type (illustrated) or cab type. Torqomotive Drive, short wheelbase.



PLYMOUTH TANDEMS—M or W Series 50 to 80 tons. The M or W Series can be built for tandem, single control operation, up to 80 tons on either 8 or 12 wheels. Each locomotive can also be operated individually.

**Torqomotive Drive; Plymouth transmission coupled to hydraulic torque-converter.*

PLYMOUTH· LOCOMOTIVES

PLYMOUTH LOCOMOTIVE WORKS

Another example of National Roll quality control

Jack Russell, National's foundry superintendent, discusses an electric furnace heat with Bill Mason of the sales department.

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National's electric furnace facilities for steel roll production are among the most modern in the industry. Furnace sizes, molding facilities, annealing equipment; all have been selected to provide the close metallurgical control needed at every step to produce high quality rolls that give long tonnage life.

This custom service extends to every roll order produced by National, whether steel, nodular iron, or iron. Since rolls are our only business, every phase of our operations is staffed with men who know *their* business, and how it affects *yours.*

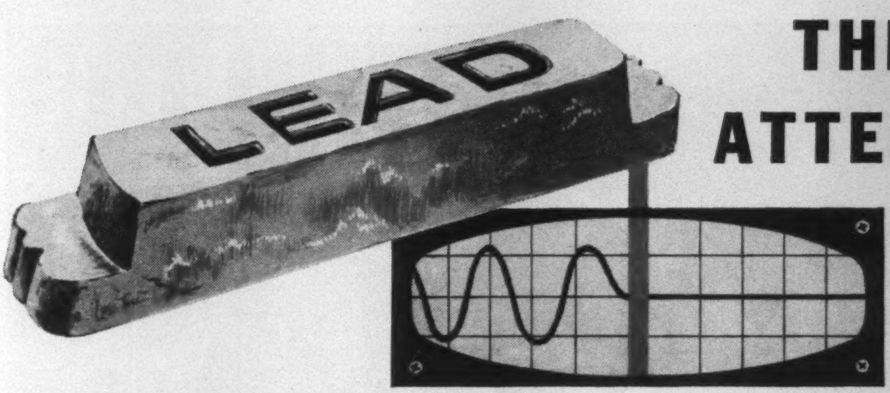
We'd like to have you meet some of these men. The best way is to plan a visit to our modern plant at Avonmore. But if time prohibits this, let us send you a brochure that will tell you more about why . . .

National's the growing name in rolls

NATIONAL ROLL & FOUNDRY DIVISION

GENERAL STEEL CASTINGS CORPORATION, Avonmore (Westmoreland County), Pa.

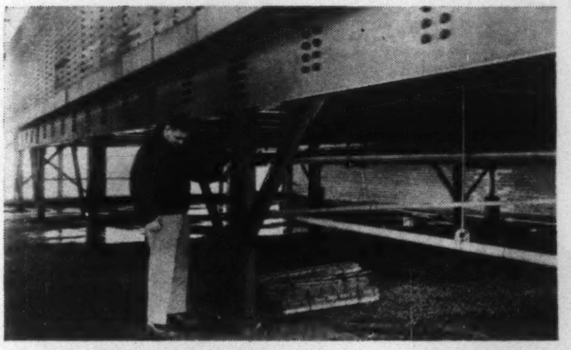
General Steel Castings Corporation, General Offices: Granite City, Illinois • Plants: Granite City, Ill., Eddystone, Pa., Avonmore, Pa.



THE GREAT ATTENUATOR*

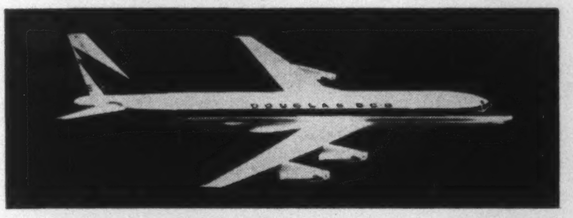
*Attenuation — Diminution of force, intensity, etc.

No other material equals LEAD'S combination of effective attenuation, low cost and compactness



IN DAMPING VIBRATION

Lead anti-vibration pads have proved an effective barrier to vibration created by railroad trains, printing presses, commerical laundry equipment and similar machinery. In the installation shown here, the roof-top cooling tower for an air conditioning system is mounted on lead pads which isolate the vibration from the building.

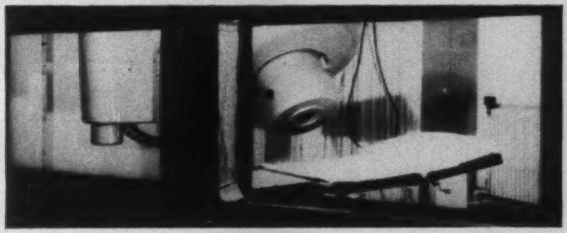


IN QUIETING NOISE

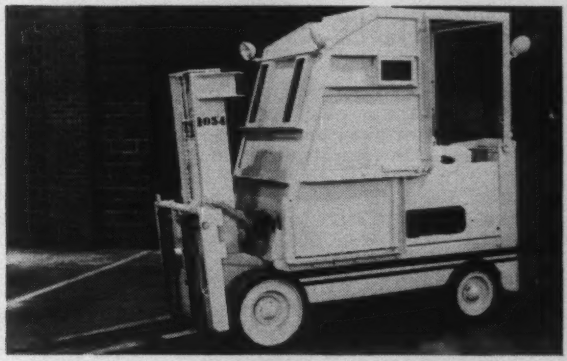
Because it is a dense, limp material, lead is an excellent sound attenuator and isolator. In powder form it is impregnated into the vinyl covering of a new acoustical fabric used to cut down engine roar in both conventional and jet airliners. This leaded fabric is also being used for sound attenuation in other applications such as electric typewriters.

IN RADIATION SHIELDING

X-RAY — Lead has long been the standard material for protection against harmful exposure to X-rays. It is used in the floors, walls, ceilings, doors and windows of X-ray rooms, in the protective clothing for technicians and in the beam-shaping apparatus of the machine itself.



GAMMA RAYS — Attenuation of gamma radiation is directly proportional to the density of the shield. Since lead is the densest of all commonly available materials, it gives the best protection per unit of thickness at lowest cost. It is widely used in nuclear reactors, radioactive waste containers and nuclear laboratories. Photo shows a lead-shielded fork lift truck with leaded glass viewing ports, used for transporting radioactive materials.



ST. JOE

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ST. JOSEPH LEAD COMPANY

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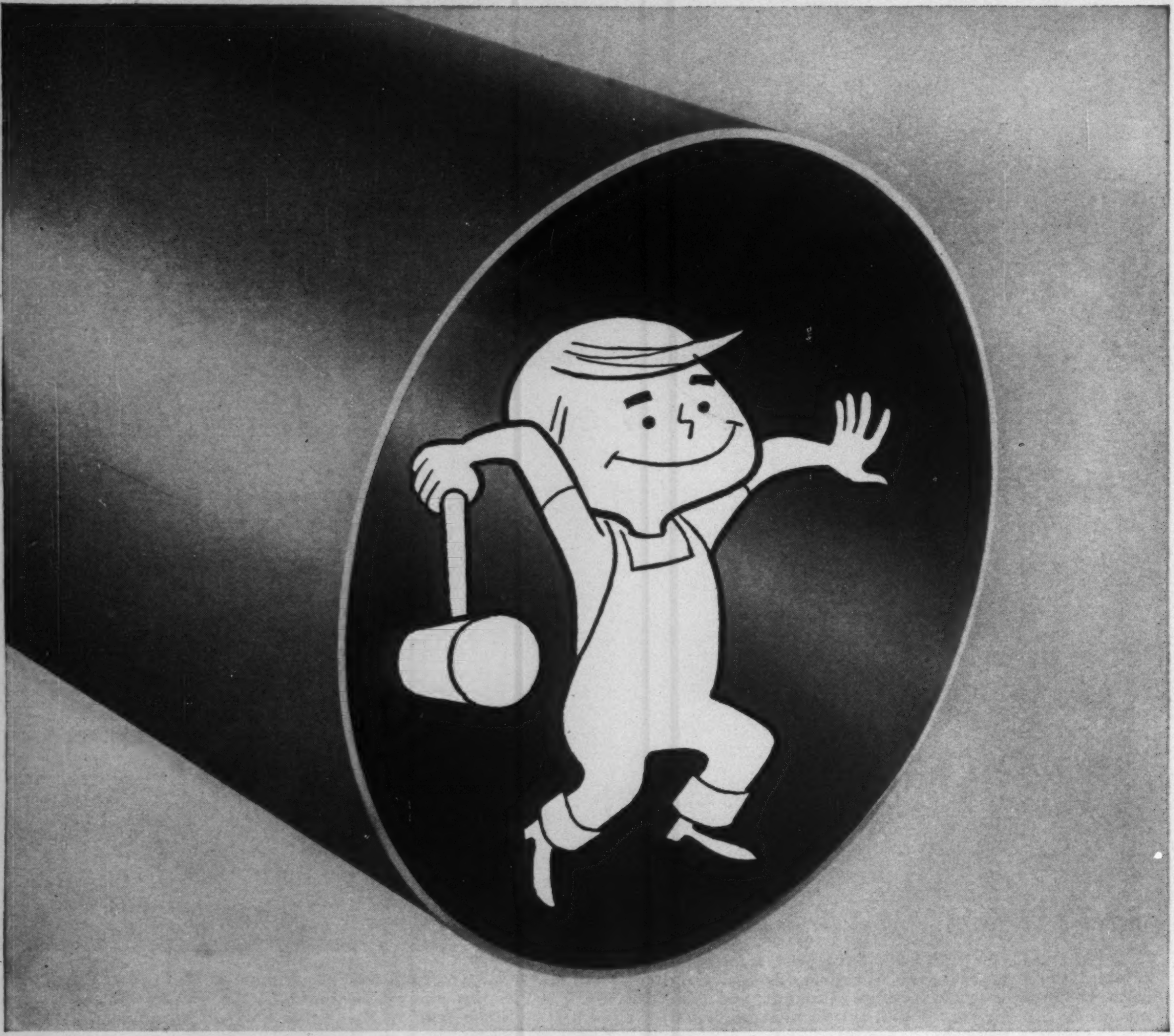
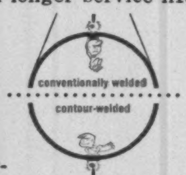


"The Gravity Kid" shows why

CONTOUR-WELDED TUBING OFFERS GREATER FATIGUE STRENGTH, LONGER SERVICE LIFE

Tubing fatigue strength depends largely *on how the tube is welded*, and the results obtained. Tubing that's smooth inside – free of flaws and bulging weld beads – offers much greater fatigue strength and longer service life.

Contour-welded tubing is smoother inside* than conventionally-welded tubing. It's smoother because *it's welded at the bottom.* Gravity pulls the metal down so that the weld corresponds to the tube's inside contour. There's no bulge on the inside surface. Even on the outside, the seam closely conforms to the tubing shape.



Contour-welding provides greater strength than conventional welding, because in conventional welding, gravity pulls the molten metal down into the tube. This can form a bead that is difficult to remove by cold working. And cold working can lead to deep, sharp undercuts that seriously weaken the tube.

Contour-welded tubing is smoother than seamless, too. That's because it's formed from uniformly rolled strip steel; whereas, seamless is produced by extruding or piercing. This strip is 100% inspected. So, there are no undetected tears or fissures inside.

See for yourself why Contour-welded tubing offers greater fatigue strength, longer service life. Write today for our free 48-page manual which describes tubing sizes from 1/8" to 40" O.D., in stainless and high alloy steels, titanium, zirconium, zircalloy, and Hastelloy**.

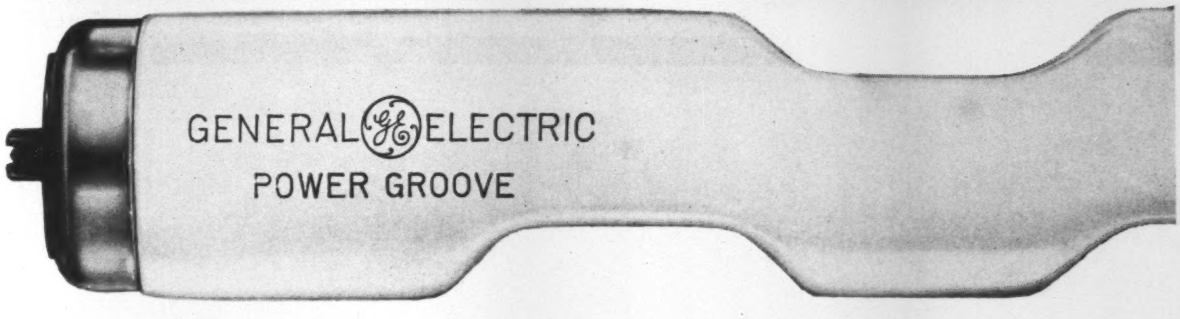
**U.S. Patent 2,716,692*

**Trademark Haynes Stellite Co.

TRENTWELD® Stainless and High Alloy Tubing

Trent Tube Company, a Subsidiary of Crucible Steel Company of America, General Offices and Mills: East Troy, Wisc.; Fullerton, Calif.

CUT INITIAL COST AS MUCH AS 40¢ PER SQ FT



It's easy with the most powerful fluorescent on the market! If you're planning a new building . . . or remodeling an existing one . . . you can shave your customer's initial lighting investment by as much as 40¢ a square foot!

How? Specify G-E Power Groove* Lamps. They give more light than any other lamp. You use fewer lamps, fewer fixtures, fewer everything else it takes to light your customer's building properly. And his savings keep mounting. With fewer lamps, fixtures and ballasts, his maintenance bills will be lower, too.

The secret's in the grooves. They're what bend the arc stream (it's straight in other fluorescents) . . . lengthen it . . . make the lamp put out more light. Only G-E Power Groove Lamps have 'em. Only General Electric gives you this years-ahead light source—another example of a difference that makes a difference in value to you. Call your G-E Lamp distributor for more information. General Electric Company, Large Lamp Dept. C-031, Nela Park, Cleveland 12, O.

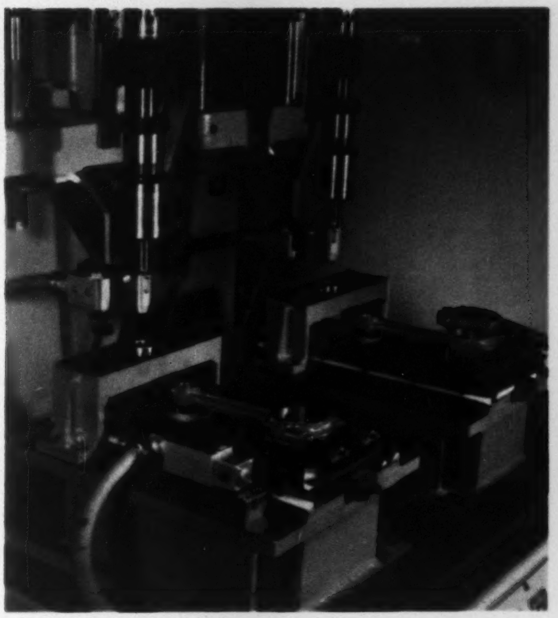
*General Electric's trademark for configurated fluorescent lamps

Progress Is Our Most Important Product

GENERAL ELECTRIC

NATCO
NATCO

Short-bore production honing finally gets its own machine tools—sturdy Natco/Jes-Cal mechanical honing machines built to maintain honing tolerances under continuous production conditions.



NEW

Natco Heavy Duty Production Honing Machines

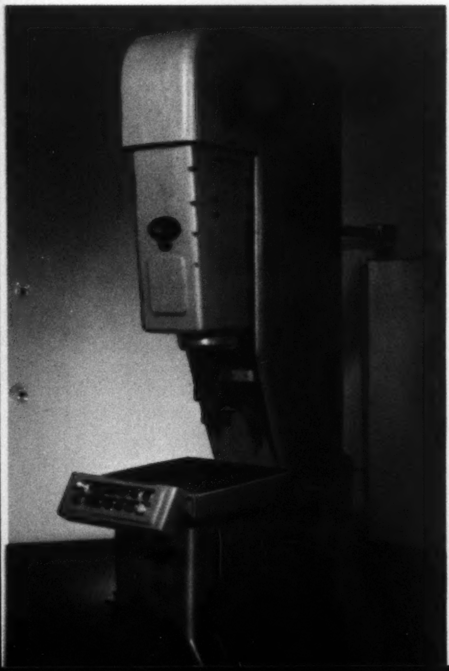
Pinion gears, connecting rods, rocker arms, compressor components—Natco/Jes-Cal mechanical honing machines have been developed for better honing of just such parts as these.

These new machines are designed to use production-proven Jes-Cal honing tools with the exclusive, automatic, plug-gage method of size control. Add the sturdiness and tolerance-holding stability of Natco machine design and you know why these are machines to end your production honing problems.

They will hone any bore from ½″ to 3″ in length and up to 3″ in diameter. Rotational speeds of 200 to 800 rpm and reciprocation from 60 to 240 strokes per minute are fixed by pick-off gears. Stroke length up to 3″ is adjustable in desired increments.

Use them singly or as multiple heads on a common base. Integrate them into your transfer line—they are fully compatible with Natco drilling, tapping, boring, and milling machines. For more facts call your Natco or Jes-Cal representative. Write for Bulletin 200.

The National Automatic Tool Company, Inc., Richmond, Indiana NATCO



Natco/Jes-Cal mechanical honing machines can be set up singly or in batteries on a common base. They are easily integrated into a Natco fully automatic transfer line.

Is your honing problem—or something like it—in this collection? These are typical jobs honed at high production rates on the new all-mechanical Natco/Jes-Cal honing machine.

HOW FAR . . . AND HOW FAST . . .

can you use computer control *profitably?*

BAILEY 700 SYSTEMS can help you determine—one step at a time

Can computer control be used—profitably—in your steelmaking operations?

Where and how?

The answer often lies in intermediate stages of improvement in sensing, measuring, controlling, computing.

Measurements now being obtained may be insufficient, or they may be profuse. Analysis, evaluation, simplification can provide substantial improvements to the point of profitable investment return.

Bailey engineers can help you determine and prove — one step at a time — how far analog or digital systems or control can be profitably applied in your operations. Bailey is equipped, by broad experience, to provide single-source responsibility from sensing and measuring instrumentation to complete automatic control. *Bailey 700 Systems* are installed, in operation, or on order, at locations from coast to coast.

Find out what this Bailey background in instruments and control can offer you. Contact your Bailey District Office.

Where Bailey progressive automation and Bailey 700 Systems aid steelmaking operations

SINTERING—to achieve maximum quantity and quality of output at lowest cost.

BLAST FURNACES — to provide lower coke rates and higher yields.

OPEN HEARTH—to increase production and control delays.

OXYGEN CONVERTERS—to maintain product quality at highest production rates.

PLANT UTILITIES—to reduce power and fuel consumption while still meeting plant requirements.

S121-1

IRON AND STEEL DIVISION
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BAILEY METERS

Metalworking Newsfront 6

A MAJOR PRESS ORDER from a big automotive producer is encouraging to press builders. While the general breakthrough in press buying by automakers isn't yet a confirmed arrival, the new order of $15 million hints that it may be coming.

AN ALL-TIME SALES RECORD was made in August in gas-fired automatic storage water heaters. Unit sales for the month totaled 279,400, up 9.1 pct from 256,100 in August, 1959.

A DIECAST ALUMINUM ENGINE BLOCK, the first made by this method, will appear in the 1961 Classic series of cars of American Motors Corp. The 127-hp engine weighs 80 lb less than the comparable cast iron engine on the 1960 Rambler. The diecast block is made of special aluminum-silicon alloy.

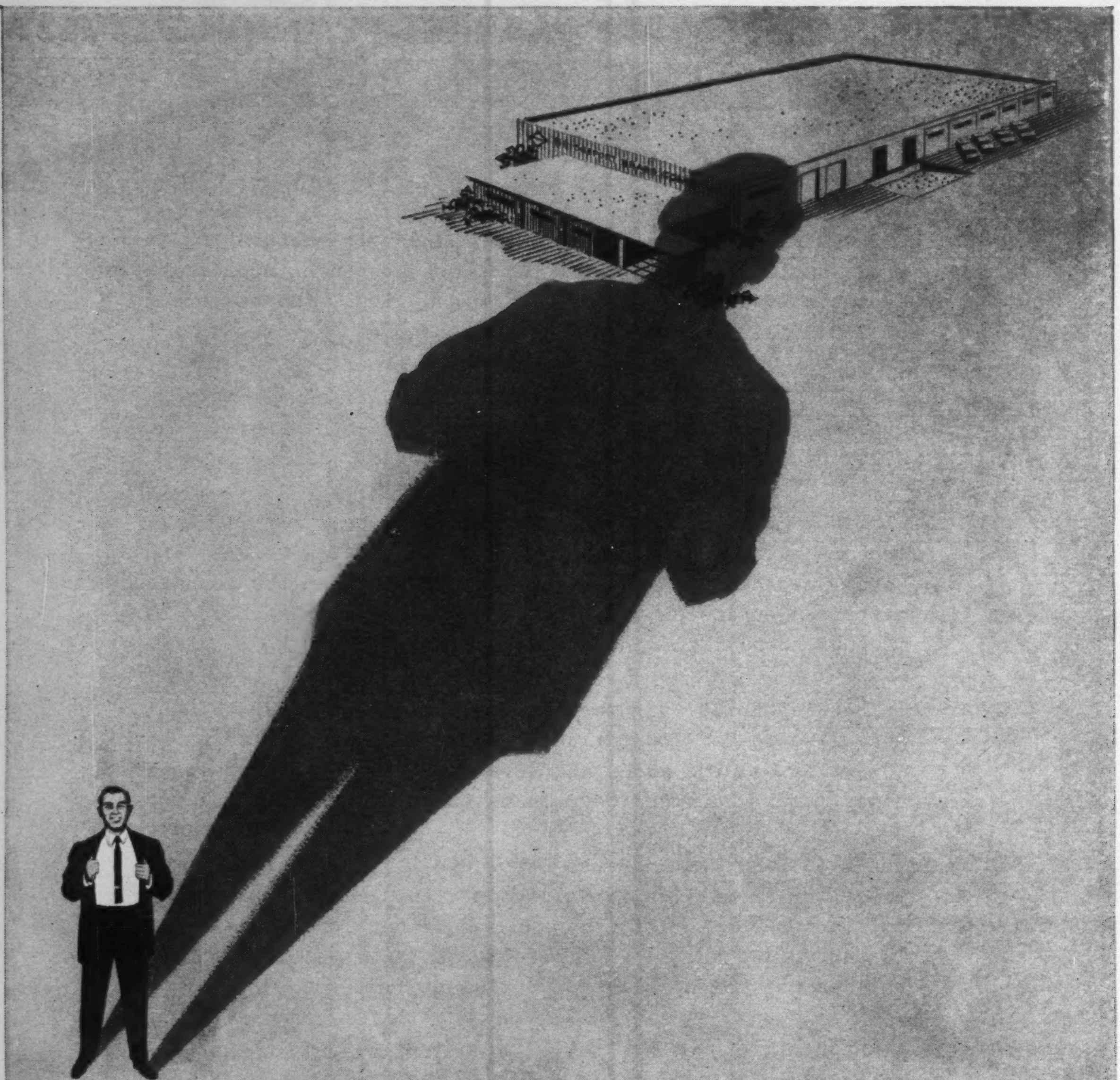
THE NATION'S BIGGEST BUYER is government—local, state, and national. According to Tax Foundation, Inc., government now takes about 28 pct of all the goods and services produced. Purchases are almost evenly divided between national and state-local.

APPLIANCES MAKE NEWS as Westinghouse Corp. and Levitt & Sons sign contract for $6 million for air-conditioning and heating and all appliances for Levitt's new 4500-home development near Washington, D. C. This is believed to be the first time a major builder has bought all such equipment from one supplier.

SEPTEMBER AUTO OUTPUT went a bit over 400,000 units. Original schedules called for 450,000. One reason for the slower production pace is the fact that 1961 model production has been picking up faster than the stockpile of 1960 models is going down.

MORE ALUMINUM USE IN BUILDING IN THE 60s is forecast by consultant J. R. Turnbull. He predicts that not only exterior wall surfaces will be prefinished aluminum, but also interior walls. The boost in interior use will come as wall surfaces will be plastic covered, giving permanent and washable wallpaper effects.

THE INDEX OF THE AMERICAN GEAR MANUFACTURERS ASSN. shows a 17.6 pct increase in August over July. The August index was 255.8 (1947-49=100) for new bookings. This is above the 1959 average of 234.7. The index of shipments rose in August to 217.3, up from 210.8 in July.



The small-volume customer is a BIG man at the BRIDGEPORT WAREHOUSE

WHY! It's Bridgeport's *policy* to give the same scrupulous service and attention to detail to every customer—small or large.

HOW! Bridgeport has a *nationwide* metals warehouse system. No matter where you are, you get fast service on Brass and Copper Alloy rod, sheet, strip and tube, and aluminum rod and strip. You'll find everything you need always on tap, ready for immediate delivery.

Fast delivery of *any quantity you require* is just one of the advantages your Bridgeport Warehouse offers. Others? For one thing, Bridgeport can save you time, money, and manpower by providing the exact sizes and metal characteristics you desire. And, of course, Bridgeport offers the best in technical service, based on generations of practical metals experience in every industry. *Getting* this Bridgeport Technical Service is as easy as dialing your telephone!

So always remember—no matter how large or small your requirements—they can be satisfied faster, easier—and *better*—at your local Bridgeport Warehouse! Call now!

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NEWARK (Hillside): Bigelow 3-0044
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Bridgeport 2, Connecticut • Sales Offices in Principal Cities • *Fast, Dependable Service on your Brass, Copper, and Aluminum Needs*

Select Markets to Suit Products

Weigh All of the Factors Against the Users' Needs

It doesn't pay to change a "brass band," according to Olin Mathieson's M. L. Herzog, unless you can improve it.

He believes that the best way to sell metals—or products—is to be sure they do a better job. —By F. J. Starin.

▪ "Brass bands are so successful, why not an aluminum band?" someone recently asked Milton L. Herzog.

As the newly-appointed head of the Metals Div., Olin Mathieson Chemical Corp., Mr. Herzog figured it was his job to find out "why not."

"I did some thinking about this," the OM executive recalls. "After all, aluminum is lighter. And someone who carries a tuba around ought to appreciate that.

"But the fact is that lightness in this case just isn't enough. Brass is simply easier to fabricate with the equipment and techniques usually used to make 'brass' musical instruments."

Basic Concept—This story hits right at the core of Mr. Herzog's ideas on selling metal. In addition to aluminum, he also heads the brass operations of OM.

"You've got to sell the right metal in the right place," Mr. Herzog insists. "After all, when you are dealing with hard objects in commerce, as contrasted to services, you are basically dealing in chemistry and physics—with the variable of aesthetic appeal."

The real trick is finding the right place, he continues. "And that is where more desirable properties are brought into focus in a specific object."

What about price?

Bicycles and Bananas — "Comparing the price per lb of two materials is like comparing bicycles and bananas," he says. "Price is just one of the properties that must be considered."

Mr. Herzog's example: In residential housing aluminum has made great strides. But in a Tudor-style house aluminum is out for many applications, on poor aesthetic appeal. Copper is the thing, even if it costs a little more. But in economical, mass produced homes, aluminum is preferable for many corresponding applications.

Mr. Herzog believes the whole building field is in the midst of a revolution—a brick vs. metal, conventional vs. functional. But, he in-

Mr. Herzog's Comments on Metals Use

"My thinking comes from the research side—looking at the metals from the chemical point of view."

"Metals have build-in properties, and it is these we want to exploit. . . . When we have taken proper advantage of such properties, the metal will stay in those places where we have put them."

"Price is important, but only in its proper relationship to the level of quality."

"Ultimately, the test is, 'What is John Doe going to get out of it?'"

EXPERIENCED: When Milton L. Herzog, corporate vice president of Olin Mathieson Chemical Corp., was recently named general manager of the Chemical Div., he brought along some definite ideas on how metals should be sold. They were formed in the 27 years he has been with the company, serving in many of its diverse operations.

sists, the decisions should be made for specific situations based on all the properties involved.

Hot and Cold—The OM metals manager sees an excellent future for aluminum in cryogenic applications—extremely low temperatures. "Aluminum maintains its strength very well at low temperatures," he declares. "But so do some grades of alloyed steel. So the user must decide what other properties he also wants in his specific application."

Mr. Herzog is optimistic about the packaging field for aluminum. But about the aluminum can he says, "Some cans make sense. But only those where the techniques and economies are right for the specific use. We reason from the properties themselves."

"Consider the radiator in a car," he suggests. "Aluminum has better properties in many respects. But copper can be joined and soldered much more easily. Considering all the properties, this is still copper's market. Aluminum may move in eventually. But not until it can offer a better combination of properties."

The Better Deal — Mr. Herzog cites aluminum's lightness as the key reason it is making gains for hand power tools. "But this isn't enough," he insists. In addition, aluminum can be cast easily. It can be extruded. It will take a variety of finishes better than most metals. And it has good corrosion resistance when needed. "It's the combination of these factors that has opened up this market," he insists.

Where is the aluminum industry headed?

"I wouldn't presume to talk for the industry," says Mr. Herzog. "But I can tell you the factors that will point the way for us.

"First of all, we have to start with John Doe. To make him want to buy things made of our metal we have to give him the better deal. The refrigerator maker may be buying the metal, but he is really paying for it with the buyer's money.

Follow Trends—"You must also make a continuous careful study of changing habit patterns. For instance, the trend toward automation is definitely growing, in the office as well as the factory. This in itself, of course, opens up possibilities for aluminum, and all materials.

Auto Market—Mr. Herzog would also like to get a share of the auto market. But this is almost a problem in itself, he notes.

"An automobile is really just the answer to a problem in physics—how to get from here to there. But we, and the auto companies, have to figure on exactly how the buyer wants to go. How much of a premium is he willing to pay for smoother, more comfortable, faster transportation?"

Find New Users—The new head of Olin Mathieson's metals operations also believes companies should consider future markets from the viewpoint that the U. S. represents a growing economy. The problem is to figure out where it is growing and to try to sell more metal in growth areas, he explains.

One possibility, according to Mr. Herzog, may be the electric car; another, the commercial development of thermoelectricity.

Mr. Herzog feels that the obvious applications for aluminum which represent out and out displacement of other materials have already been made. From here on, he believes, it will call for developing new markets and expanding current ones.

Brass Business—Mr. Herzog concedes that the market picture for brass is more static than aluminum. However, he says "I may be wrong but I feel a little bullish about brass. I think there are a lot of areas which we haven't exploited.

"After all, we have an extremely wide range of alloys from almost pure copper to almost pure zinc, including third and fourth elements. It gives us more flexibility to come up with the right combination of properties."

Generally, Mr. Herzog sees a bright future for all metals, and "hard" objects.

Are Trade Reform Laws Likely?

Next Congress Will Try to Solve Trade Problems

How can the U. S. step up its foreign trade without hurting domestic industry?

Congress is searching for the answer and some proposals will be offered during the next session.—By R. W. Crosby.

■ Congress will tackle the nation's most serious trade problem next January. The issue: How can the U. S. increase foreign trade without hurting domestic industry?

The problem, so far, has been insoluble.

Trade Reform Likely—Legislators in both houses of Congress—led by Sen. Jacob Javits (R-N. Y.), in the Senate, and by Rep. William G. Bray (R-Ind.), in the House—are seeking the answer. They definitely will offer trade reform legislation in the coming session.

They say among the industries being threatened by foreign competition are automobiles (including equipment and parts), electronics products, and fabricated steel.

One of the immediate worries of these congressmen is the increased investment by U. S. industry in foreign countries.

No Problem—Yet—International investment expert Samuel Pizer, in the Office of Business Economics at the U. S. Department of Commerce, told The IRON AGE this buildup by U. S. companies abroad doesn't present a serious problem at present.

He says that although the value of U. S. companies' holdings abroad has increased to more than $30 billion, there is no "exodus" of companies to foreign shores.

He agrees, however, that if the trend continues it could be dangerous to domestic industry.

Why Build Overseas? — Congressman Bray says that more than 3000 leading U. S. manufacturers have used this $30 billion to build plants abroad in hopes of meeting cheap foreign competition. He warns that the number will grow unless Congress acts next year. Bray leads a group which wants to put an end to any tariff reductions for foreign goods.

Sen. George D. Aiken (R-Vt.), one of Javits' backers in the foreign trade battle, agrees we "cannot supplant our own production" by developing products abroad and shipping back to the U. S. But he and Sen. Javits call for a "comprehensive trade policy." They do not believe cutting foreign imports will solve the problem.

What Congress Plans—The legislation which Sen. Javits will introduce next year will follow this "comprehensive line."

His plan will call for establishment of new trading areas for the U. S., especially in newly developing countries.

Different Views—Any law to discourage imports will be opposed by the President next year. Both Vice President Nixon and Sen. Kennedy, though favoring the slowdown of imports, say they will oppose a law designed to do only that.

Most congressmen believe this is impossible. A bill like the one proposed by Sen. Javits will undoubtedly get much attention in the 87th Congress.

How to Ease Sting of Imports

What can be done to curb the impact of imports? One legislative group—the Senate Small Business Committee — made these recommendations at the past session of Congress:

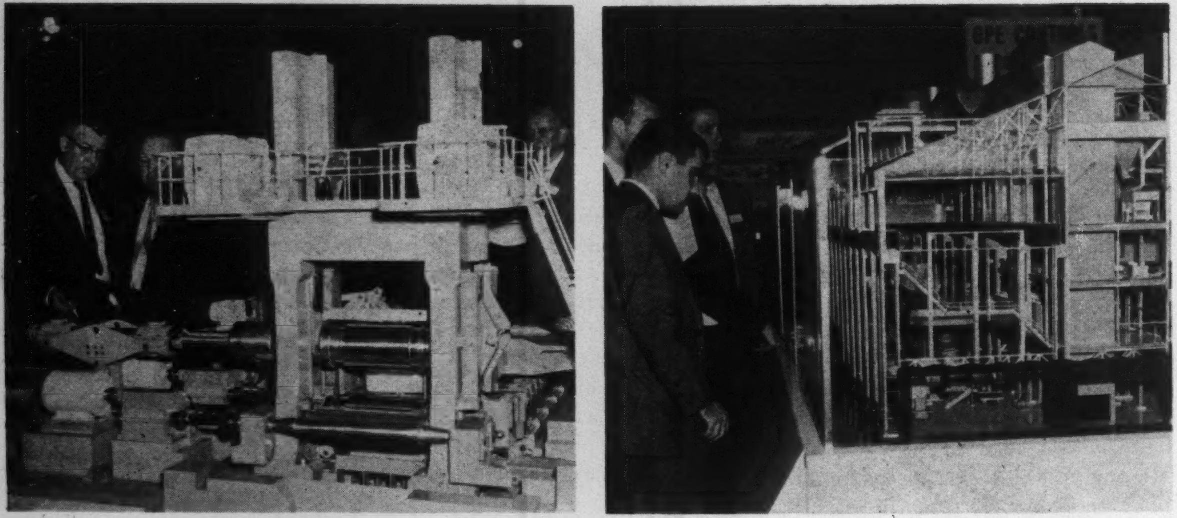
Tariff Concessions: U. S. tariff negotiators should vigorously demand tariff concessions from other nations. They should also resist lowering U. S. tariffs on goods made abroad under sweatshop conditions.

Limit Unusual Importing: The U. S. should prevent sharp and unusual increases in imports, so American manufacturers can adjust to their impact gradually.

Protect Patents: The government should act to prevent pirating of patents and designs by foreign manufacturers.

Aid to Affected Industries: Thought should be given on aid to industries affected. For companies threatened or hurt by imports these could include: Loans, market research, and tax concessions (such as fast amortization on new machinery).

Other Recommendations: Congress should consider allowing the President to soften tariff recommendations of the Tariff Commission. The government should step up its collection of data on overseas wage rates and production costs.



ATTENTION GETTERS: Steel engineers at AISE show, paused to study Demag blooming mill model, left. Also of interest were oxygen developments like Koppers model of a new oxygen-making plant, right.

New Processes Attract Steelmen

Despite lagging business, steel engineers are seeking out cost-cutting and product improvement processes.

Direct reduction process draws attention at Cleveland steel engineers show.

—By T. M. Rohan.

▪ Despite the sluggish state of the industry, steel mill engineers were out in force to look over new equipment at the Iron and Steel Engineers Show in Cleveland last week.

Early registered attendance was 18 pct ahead of the last show two years ago. And there was 26 pct more exhibit space to see.

Major trends in the show appeared to be:

Greatly renewed interest in a variety of direct reduction schemes.

Improving blast furnace yields with better handling and beneficiated ore, oxygen steelmaking, more instrumentation, automation and, more concern with air pollution devices resulting from oxygen steelmaking.

Direct reduction models were shown by American Demag, Koppers Company, Inc. (Strategic-Udy process), Mc Dowell Co., and Hydrocarbon Research.

Show Model—Direct reduction is more of a going thing in foreign countries, based on show models, although U. S. steelmakers are going at it more cautiously. Demag showed a model of units at the Ilsede-Peine works in Peine, Germany and two ISCOR works in South Africa.

Demag's unit, invented by Oberhausen, blows oxygen directly into the bath of a rotary furnace. The 110-ton capacity furnace revolves at 1/5 to 4 rpm and can be tilted from vertical to horizontal for charging or pouring. It is turning out 12 to 15 heats per day and lining life is 450 to 500 heats. But 750 is hoped for eventually. A stand-by rotary converter is kept nearby and relined for alternate use.

Strategic - Udy Developments—Koppers expects to start work soon on a full scale commercial Strategic-Udy process plant at Kingston, Ont., for a $14 million project of Explorations, Ltd. Three or four others are also in advanced planning and awaiting financing. The Kingston plant will be started from scratch to produce 300-500 tons per day of pig iron from 40-60 pct Fe ore. The ore will be pre-reduced in a kiln to slightly below fusion temperature, then put into a 22,000 kva electric furnace to produce pig iron, says James F. McFarlin, Koppers engineer. The project will be operated by Koppers and includes a concentrating plant, ore mining and limestone pits. The ore property is owned by New Mylamaque Explorations, Ltd. at Newboro, about 35 miles north of Kingston. Koppers now has pilot and semi-commercial plants in the Niagara Falls area.

Operating Exhibit — McDowell Co. of Cleveland showed visitors an actual working direct reduction pilot plant in town which has been in operation about two years. At this plant non-magnetic ore is ground, rolled into balls and sintered, then fed to an electric furnace at about 1500° F for final smelting.

"Based on economics developed

in the company's demonstration plant studies, a single unit Dwight-Lloyd McWane plant producing about 500 tons of pig iron per day will cost between $6 million and $7 million to build," says R. C. McDowell, company president.

"This represents a capital cost of between $35 and $45 per net ton. By comparison, a modern blast furnace and coke plant requires an investment of approximately $90 per net ton of annual capacity."

Big Draw — Hydrocarbon Research also attracted large crowds of direct-reduction enthusiasts with models of its H-Iron process at Alan Wood Steel Co. and Bethlehem Steel at Los Angeles. The latter is designed to turn out 110 tons of iron and is now going on stream.

A unique "job shop steel mill" universal merchant bar mill which will run with stands vertical or horizontal was shown by Loewy Div. of Baldwin Lima Hamilton. This mill is being installed at Wisconsin Steel Div. of International Harvester at Chicago. Whole roll stands will be lifted and turned 90° with a crane so that rolls operate either vertically or horizontally.

Rolls can be changed in spare stands out of operation and put into service in about one-half hour. Thus, the mill is kept in service without the several hours necessary for roll changes. The vertical-horizontal feature permits rolling both sides without long trains. It will handle a wide variety of bars, angles, flats, small structurals, channels and spring steel with minimum downtime.

New Design—A model of a 40-lb top-pressure blast furnace shown by Koppers also attracted much attention from steelmen. This design has been developed for beneficiated ore and boasts 4000 tons per day of iron from a 28-ft. furnace of the size normally yielding about 2000 tons per day.

Major design departures are two small bells instead of a large one to avert maintenance of seal problems of the higher pressure, a series of retaining rings instead of an ore spreader and an air cooled hearth.

Microscope Shows "Tired" Atoms

A new microscope, developed by Dr. Erwin Muller, enables scientists to visually study atoms in metal.

Other developments were also displayed at the annual conference of the Instrument Society of America.

▪ Two new developments of interest to metalworkers were revealed at the annual conference of the Instrument Society of America, held recently in New York.

The developments: A field ion microscope to visually study atoms; the founding of an Institute of Measurement Science (Metology).

The microscope was announced by Dr. Erwin Muller after he received the ISA Distinguished Achievement Award. Dr. Muller later told The IRON AGE he has been working for four years on the atomic structure of metals.

"We are carefully watching metal specimens during fatigue. We watch the atoms literally float away and the crack develop. Also, we have discovered atoms missing from the lattice of some metals at high temperatures. We know that misarranged atoms in a metal crystal are responsible for the limited strength of some metals. Maybe soon we can do something about this."

A New School — Prior to the ceremony honoring Dr. Muller, the National Bureau of Standards, George Washington Univ., and The Martin Co. jointly announced the founding of an Institute of Measurement Science at George Washington's School of Engineering.

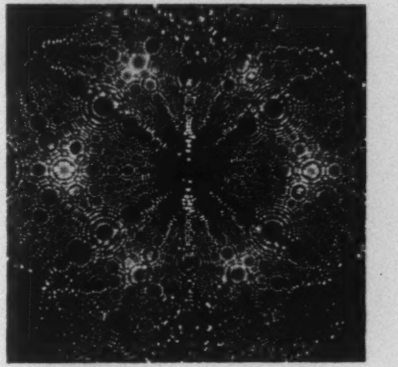
Starting in February, engineers will be able to study for Metology degrees on both undergraduate and graduate levels.

Underwater Activity — Also at the conference, were some interesting sessions on underwater instrumentation.

Of the other instruments on exhibit, few were really new in concept. The vast majority were refinements of previous equipment.

For instance: Decker Corp. has adapted the gyroscope principle to a flow meter. It "measures the mass flow of nearly anything that passes through it from heavy liquid to light gases."

General Electric Co. has come up with a leak detector. It claims this can be used by production workers after only one minute of instruction, and it nearly eliminates chance of mistake.



TUNGSTEN: Floating Atoms?

A Bargain Price—GE is also producing a transistorized frequency telemetering system with a bargain basement price—34 pct lower than similar GE products.

Leeds & Northrup Co. says its new Controlall Assembly is "specifically designed for use in pilot plants, research laboratories and plant processes where there is need for a flexible system adaptable to practically any type of control problem."

Goodyear Tests Heat Resistance

TOPSY-TURVY: A Goodyear Tire & Rubber Co. scientist examines fragile glass bubbles in a furnace which generates three times more heat than molten lava. His reflection is distorted by an ellipsoidal focusing mirror. The furnace is used by Goodyear to test experimental rocket liners.

Phoenix Buys CF&I's Claymont Plant

▪ Phoenix Steel Corp. has bought the Claymont, Del., steel plant from Colorado Fuel & Iron Corp.

The purchase, effective Oct. 3, was announced jointly by A. F. Franz, president of CF&I, and J. A. Sisto, chairman of Phoenix Steel.

Capacity Changes — The Claymont plant with an annual rated ingot capacity of 506,500 tons, gives Phoenix an annual ingot capacity of 1,353,260 tons, making the company the 17th largest steel producer. Loss of Claymont reduces CF&I's present annual ingot capacity to 2,330,000 tons. The change drops the company from 10th to 11th ranking among steelmakers.

The Claymont plant can produce plate, including stainless clad and alloy grades, electric weld pipe, and spun and dished heads. (Phoenix already has a plate mill at Harrisburg, Pa.)

Hot Metal Available—Commenting on the sale, Mr. Sisto said, "Phoenix's Chester blast furnace which is only 3 miles from Claymont was a key factor in the decision to purchase Claymont. The Claymont plant has no blast furnace.

"The use of the Chester blast furnace to supply hot metal to Claymont's openhearths will produce the quality and cost benefits of integrated steelmaking and make possible the adoption of new oxygen processes."

CF&I's Reasons — Mr. Franz pointed out, "The sale of Claymont will provide cash proceeds and release working capital which we believe can be put to work more profitably in improving and expanding our main plant at Pueblo, Colo.

"We have already embarked on an extensive modernization program there which will provide new oxygen steelmaking facilities capable of producing over 600,000 tons of ingots annually to replace or expand older existing equipment."

Mr. Sisto noted, "The acquisition of Claymont will broaden Phoenix's product mix by the addition of several new specialty products including stainless clad plate, alloy plate, and electric weld pipe. The mill is located only 20 miles from Philadelphia and is ideally located to serve customers in the Eastern market."

What's Included—The Claymont property covers 725 acres with over a mile of waterfront on the Delaware River. There is ample acreage for future expansion. The plant has seven openhearth furnaces, two plate mills, 160-in. and 120-in. in width, with a combined annual capacity of 300,000 tons. Also included are an electric weld mill for large diameter pipe, a large fabricating shop, and a flanging, pressing, dished and spun head department.

GE Develops New Heat Treat Unit

The fluid bed is moving the heat treating field. It's the key behind the high production rate of a new type of heat treat furnace soon to be unveiled.

Engineers at GE's Industrial Heating Div., Shelbyville, Ind., also report that the new unit allows precise heating and quenching cycles and improves product quality.

Within the furnace chamber is a bed of fine refractory particles resting on a screen. Gas, forced up through the screen, lifts and agitates the particles. It's in this turbulent, fluid bed that an object is immersed for heat treatment. The fluid medium transmits heat very rapidly and efficiently.

Applications for this unit range from stress relieving aluminum and magnesium castings to pre-annealing of copper tubing.

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DENISON HydrOILics

How **HEWLETT-PACKARD** marks instrument panels faster, for less with **DENISON** Multipress

MARKING

MARKING INSTRUMENT PANELS *with 50-ton (left) and 125-ton Denison hydraulic Multipresses at Hewlett-Packard Company, Palo Alto, California. Multipress saves 8 to 10 times the cost over former marking methods. Completed, typical panel is shown at left.*

MARKING instrument panels with Denison hydraulic Multipress is saving Hewlett-Packard Company 8 to 10 times the cost of previous hand engraving methods which proved too costly, too slow.

These problems were solved—and marking costs greatly reduced—with installation of two Denison hydraulic Multipresses.

The presses are operated at pressures from as low as 50 lbs. to a maximum of 125 tons with control of stamping depth to within .001"—evidence of extreme precision *and* versatility. Hydraulic press marking also allowed use of a less expensive aluminum stock which substantially reduced raw material cost.

Hewlett-Packard's savings are typical of how Multipress can do hundreds of presswork jobs better and save you production money. Ask the Denison Production Specialist near you about a **M**ultipress **A**nalysis **P**rogram in your plant. There's no cost to you. He'll welcome working with you to **M A P** new ways to speed, improve and lower the cost of your press operations.

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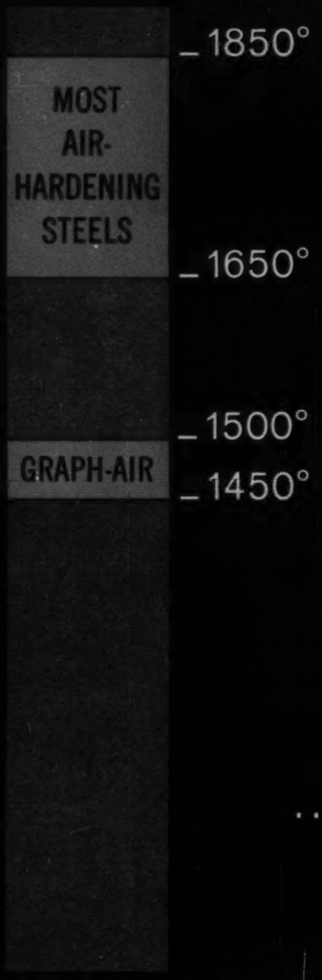

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Finding Better Ways to Manage

Is the tough approach to management the most efficient way to get things done?

Modern managers are trying a new approach—encouraging employees to think for themselves and grow.

▪ What's the best way to manage? Should supervisors concentrate on the job to be done, or the people who do it?

These are two questions asked in the growing study of a manager's real role in business. In the past, and in many companies today, the boss is simply the boss. He tells people what to do, when to do it, and how to do it. He orders and forbids, rewards and punishes.

Lead, Not Push—But is this the best way to get things done? More companies are now looking into a different approach—developmental management. In this method the boss is the leader. He seeks to persuade, draw people out, encourage use of their judgment, and increase their range of skills.

Starting with the aim of getting more work out of people, research has turned to the causes of industrial "unhappiness."

What They Want—Surveys made by the Opinion Research Corp., Princeton, N. J., reveal methods of dealing with employees often ignore basic forces—the desire to take part, the need to be important. The ORC has reviewed over a hundred employee and managerial studies it conducted in the last two decades, plus work by special scientists. (See right.)

They show pay is not the principal point of employee unrest. A more frequent complaint is lack of opportunity. Generally employees have a sense of pride in their company.

However, the ORC points out, "the direct approach of pressuring people to do more work leads to immediate resistance. But, people can be encouraged to work smarter, rather than harder. They can be helped to get more satisfaction from their work. Then more work is possible as a by-product of this greater interest and involvement in the job."

How It's Done—The basic problem: How to get and keep this employee interest? The developmental manager, according to the ORC, decides on the objectives, then challenges his people to find the best way of meeting them.

The aim is a climate encouraging people to develop themselves, become involved with the problems, and look for the answers.

Check and Decide—Within reasonable margins of error, subordinates must be responsible for decisions. Their performance must be evaluated. Those who fail to measure up should be replaced.

Helpful in adopting the developmental approach is critical self-examination of the company.

What Employees Believe

▪ Pride in company is a dominant theme among American workers. And most people in industry are quite enthusiastic about the work they do.

Those are the trends that the ORC found in virtually all the companies surveyed. Says the ORC, "It matters not whether they view their company through rose-colored glasses or with a jaundiced eye. This is the employees' view of reality and the one that has much to do with how they act."

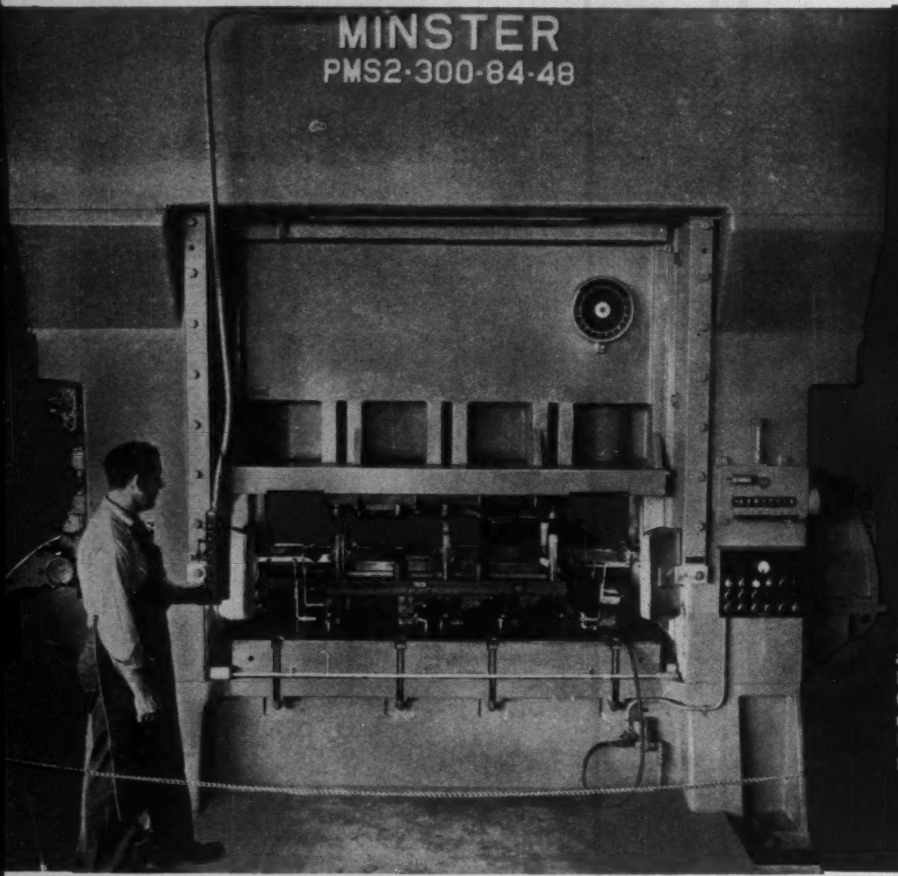
Some Complaints—Beyond company pride, however, the employees have some specific complaints. The most common one, as mentioned, is lack of opportunity to advance. This holds true whatever the group interviewed—manual workers, office and clerical help, engineers and scientific personnel.

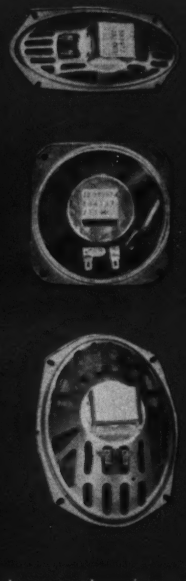
Many people in large companies believe decisions on advancement are arbitrary. Few employees feel management really makes an effort to get the right people in the right job.

Communicate, Communicate—In addition, many employees complain they are not given enough information. They do not feel they are an important part of the system. Typical comments might be: "They don't keep me informed. They pay no attention to me as a person. They never ask for my ideas. They don't give credit when you do a good job."

Generally there is high confidence in the manager's knowledge of the work. But there's much less in his ability to encourage and develop people.

AUTOMATIC PRODUCTION reduces costs...savings pay for the press





1800 loudspeaker conehousings per hour are produced on progressive dies in this Minster 300 ton double-geared Progress-O-Matic press which operates at speeds ranging from 25 to 50 strokes per minute. Photos courtesy of The Magnavox Company, Components Division, Paducah, Ky.

For Magnavox . . . this MINSTER Progress-O-Matic Press

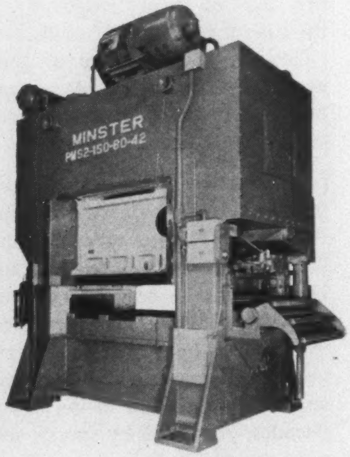
saves 600% direct labor cost

saves 90% die maintenance cost

saves 75% die set-up time cost

saves 25% material cost

cut finished part cost by 50%



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1960's Presidential Campaign

The Business Issues—2

An IRON AGE Interview with **Sen. Henry M. Jackson,** Chairman, Democratic National Committee.

Clashing ideas over the way business and government can best strengthen the nation underlie every major economic issue in the 1960 presidential election.

This is the second of two interviews on the business issues in the campaign as set forth in Republican and Democratic Party platforms. Last week The IRON AGE interviewed Republican Platform Chairman, Charles H. Percy, a Chicago industrialist.

In this interview, managing editor E. C. Beaudet, asks similar questions of Sen. Henry M. Jackson, Chairman of the Democratic National Committee. Both interviews, strongly partisan, reflect the basic philosophies of the two parties on the proper roles of business and government in furthering national strength.

The Democratic Viewpoint On:

★ The Growth Rate

★ Inflation

★ National Debt

★ Labor

★ Import Threat

★ Taxes

★ Unemployment

■ **Q. Senator Jackson, what do you consider the major business issues in this year's presidential campaign?**

A. The Democratic and Republican Platforms differ in their degree of satisfaction with the state of our economy and its rate of growth. The Republican Platform reflects complacency; the Democratic Platform makes a number of criticisms, including the following:

1. The rate of economic growth is barely half the rate that can and should be achieved.
2. Far too-high rates of unemployment have been tolerated.
3. The tight money policy has restricted business and has pushed interest costs unnecessarily upward, while failing in its stated purpose of keeping prices down.
4. The Republican record is marred by two recessions, the most severe peacetime inflation in history, a budget unbalanced by $19 billion in the aggregate over 7 years, and mismanagement of the public debt.

The Democratic Platform reflects the belief that the rate of economic expansion can be increased without inflation, and that such expansion is the key to raising the revenues necessary for improving many domestic public services.

(Continued on p. 142)

Helmsman: As chairman, Oregon's Sen. Henry M. Jackson stands at the helm of the Democratic National Committee in the 1960 election campaign. A hard worker, he served six terms in the House before his election to the Senate in 1952.

■ Q. What does the Democratic Party Platform advocate to step up the nation's economic growth rate?

A. Our economy can and must grow at an average rate of 5 pct annually, almost twice as fast as our average annual rate since 1953.

As a specific measure to stimulate growth, the Platform urges the removal of artificial restrictions on the economy through the present high-interest, tight-money policy; specific measures to increase employment in depressed areas and among groups suffering extraordinarily high unemployment; and prompt counter-measures, such as public works or temporary tax cuts, when recessionary trends appear.

No one proposal in the Platform alone will bring about more rapid growth. This will be the result of all of our economic policies taken together, but each must be related to the objective.

The failure of the Republican economic policy has been due in part to their lack of emphasis upon full employment and growth as primary objectives.

■ Q. Like the Republican Party, the Democratic Platform calls for a program of federal tax reform. Just what areas does this cover? And what does it mean to business?

A. The specific language of the Democratic Platform relating to tax reform follows:

"We shall close the loopholes in the tax laws by which certain privileged groups legally escape their fair share of taxation. Among the more conspicuous loopholes are depletion allowances which are inequitable, special consideration for recipients of divided income, and deductions for extravagant 'business expenses' which have reached scandalous proportions."

The Democratic Platform also pledges additional enforcement personnel, and new techniques of enforcement to collect tax revenue now lost through evasion. The Internal Revenue Service is still suffering from the cuts inflicted upon its enforcement staff by the Republican Administration and Republican Congress in 1953. The Administration's own Commissioner of Internal Revenue has testified that billions of dollars in revenue are lost each year because the Service does not have sufficient enforcement personnel.

The Democratic Party believes that with these reforms and with an economic growth rate approaching 5 pct, we will be able to maintain, except in periods of recession or national emergency, a balanced budget, with no increase in present tax rates, and with some surplus for gradual reduction of our national debt.

■ Q. What approach does the Democratic Party think will result in the best solution to the problem of depreciation reform?

A. The Platform makes no comment on depreciation reform. However, many Democrats believe that a more liberal depreciation policy would stimulate investment and thus contribute to economic growth.

Since our Party is fully committed to full employment and rapid growth, I would expect depreciation reform to be among the policies seriously considered by a Democratic Administration.

■ Q. What does the Democratic Party Platform suggest which will bring about closer harmony between management and labor and at the same time be in the best interest of all citizens?

A. The Democratic Platform pledges a better climate for continuing constructive relationships between labor and management. A Democratic President will call periodic White House conferences between labor and management to consider their mutual problems before they reach the critical stage.

A Democratic President will use the vast fact-finding facilities that are available to inform himself, and the public, in exercising his leadership in labor disputes for the benefit of the nation as a whole.

If he needs more such facilities, or authority, the Democratic Party will provide them.

The Republican Platform asserts that Republican leadership will continue to encourage discussions, away from the bargaining table, between labor and management. But the Republican Administration of the past eight years has failed to provide the necessary leadership.

It failed to foresee the deterioration of labor-management relations in the steel industry last year. When the national emergency came, the Administration's only solution was government-by-injunction.

In short, the platforms differ in that the Republicans express satisfaction with the way things have been going; the Democrats believe that White House leadership has been lacking and should be restored.

Q. The country has seen a steady growth of inflation since World War II. Can it be stopped? What does the Democratic Party Platform regard as the best means of combating further inflationary trends?

A. Inflation since World War II has been of two kinds. Immediately after the war and again at the outbreak of hostilities in Korea, inflation was the result of the sudden expansion of an excess of purchasing power in relation to the availability of goods and services. These were instances of "classical" inflation, sometimes defined as "too much money chasing too few goods."

Since 1953, however, our price increases have not been of the classical variety, since there has been no shortage of goods and services. Rather, there has been considerable slack in the economy through most of this period. Right now, for example, unemployment stands at 6 pct and industries are running generally far below capacity. Yet price rises continue.

Stopping inflation clearly calls for measures additional to the classical measures of monetary and fiscal policy to which the Republicans have limited themselves.

Our Platform specifically says, "The American consumer has a right to fair prices. We are determined to secure that right.

"Inflation has its roots in a variety of causes; its cure lies in a variety of remedies. Among these remedies are monetary and credit policies properly applied, budget surpluses in times of full employment, and action to restrain 'administered price' increases in industries where economic power rests in the hands of a few."

More rapid economic growth and a policy of lower interest rates also will help stem inflation—the former by increasing the production of goods and services and, hence, reducing unit costs; the latter by reducing the interest-rate component of the price of major items.

■ **Q. How seriously does the Democratic Party Platform consider reducing the national debt?**

A. Very seriously.

The Democratic Platform states that "responsible fiscal policy requires surpluses in good times to more than offset the deficits which may occur in recessions, in order to reduce the national debt over the long run."

The Republican Administration has produced the deficits—in fact, the greatest deficit in any peacetime year in history (1958-1959)—but only occasional and meager surpluses. Their first seven years produced a net deficit of nearly $19 billion.

The public debt has been further mismanaged by the failure of the Republicans to lengthen the average maturity of Government obligations when they had clear opportunity to do so.

We in the Democratic Party reject the notion that America, with a half-trillion dollar gross national product, and nearly half of the world's industrial resources, cannot afford to meet our needs at home and in our world relationships. With a higher rate of economic growth and with the closing of tax loopholes and better tax law enforcement, we can meet these needs and balance the budget with a surplus for the gradual reduction of our national debt.

■ **Q. What about "administered" prices? The Democratic platform pledges action to restrain them in industries where there is so-called concentration of economic power. What does this mean?**

A. In recent years, both in good times and recessions, "strong" industries have been able to push

(Continued on p. 144)

The Import Threat

■ **Q. What does the Democratic Party Platform advocate to restore the U. S. balance of payments to a favorable position?**

A. While our payments position is currently unfavorable, this does not arise from an unfavorable trade balance. We still sell abroad more than we buy.

Our payments deficit arises from other factors which must be dealt with in various ways. The carrying out of aid programs on a multi-lateral basis, with greater participation by the prosperous countries of Western Europe and Japan, will help our position.

Most important, the restoration of a thriving domestic economy, which is free of inflation, will tend to reduce the current deficit in the flow of international investments.

■ **Q. Some American industries, particularly in metalworking, are suffering from imports of lower-priced foreign products. What does the Democratic Party Platform offer as means of correcting or at least alleviating this situation?**

A. The Democratic Platform endorses the expansion of world trade.

However, it acknowledges that foreign imports have involved costly adjustment and damage to some domestic industries and communities, and that these effects are often unavoidable.

The Platform advocates trade adjustment measures to help affected industries adjust. Direct loans, tax incentives, and priority in awarding of defense contracts are suggested. The Platform also points out that in a rapidly expanding economy, such adjustment is far easier.

The Platform does not advocate higher tariffs as the answer to rising imports.

GLOBAL VIEW: Sen. Jackson and CIA chief Allen Dulles pose with globe at Senate hearing. Jackson favors more world trade.

"The Democratic Party is committed to maximum employment . . ."

through successive price increases, which they in turn attributed to wage increases. These pace-setting industries are relatively invulnerable to general monetary and fiscal controls, which are designed to deal with the classic inflationary situation where "too much money is chasing too few goods."

The insistence of the Republican Administration upon using classical anti-inflation measures where they are inappropriate has resulted in a stagnant economy while prices have continued to climb.

The platform is not specific about the means of restraining "administered price" inflation, but the first step obviously is acknowledgment of the existence of "administered price" inflation and investigation of its nature, prevalence, and importance. The Republicans have yet to take this first step.

■ Q. What solutions does the Democratic Party offer to unemployment problems resulting from changes in technology, markets and distribution methods?

A. Where unemployment resulting from these causes is heavy and prolonged, the Democratic Platform supports area redevelopment legislation, including: Low interest loans to private enterprise to create new industry and new jobs in depressed communities; assistance to the communities to provide public facilities necessary to encourage new industry; and retraining of workers for the new jobs.

The Democratic Congress twice passed such legislation. The Republican President twice vetoed it. A Democratic President in 1961 will sign an area redevelopment bill.

The Democratic Platform also pledges planning for automation, so that men and women will be trained and available to meet shifting employment needs. It favors action to break down artificial and arbitrary barriers to employment based on age, race, sex, religion, or national origin.

■ Q. What policies does the Democratic Party Platform advocate for the welfare of smaller business?

A. The Democratic Platform pledges a number of specific policies under the following headings:

1. "Action to aid small business in obtaining credit and equity capital at reasonable rates."

2. "Protection of the public against the growth of monopoly."

3. "A more equitable share of Government contracts to small and independent business."

Small business has been a particular victim of the Republican Administration's high interest rate policies. The Republican Platform, which includes its comments on small business in a generalized section entitled, "Economic Growth and Business," endorses these policies. It shows no recognition of the real issue for small business—the need for positive action to create an economy in which small business can grow and flourish. This action the Democratic Platform pledges to take.

■ Q. What policies does the Democratic Party Platform advocate for the welfare of large business?

A. The Democratic Party proposes, in the words of our platform, "to unshackle American enterprise and to free American labor, industrial leadership, and capital, to create an abundance that will outstrip any other system."

The Democratic Party is committed to maximum employment, at decent wages and with fair profits, in a far more productive, expanding economy. Only in such an economic atmosphere can either big or little business flourish.

Under the Republican philosophy of economic slowdown, our whole system is damaged. While massive human needs exist, we lose production because of idle workers, idle machines and under-developed resources. And, as the current stock market decline shows, business profits and the expectation of profits have suffered severely.

■ Q. What approach does the Democratic Party consider the most practical for stimulating technological progress in both defense and non-defense areas of scientific endeavor?

A. These are excerpts from the Democratic Platform relating to science, space, and atomic energy:

"We will recognize the special role of our Federal Government in support of basic and applied research."

SPACE. "The Republican Administration has remained incredibly blind to the prospects of space exploration. It has failed to pursue space programs with a sense of urgency at all close to their importance to the future of the world.

"It has allowed the Communists to hit the moon first, and to launch substantially greater payloads. The Republican program is a catch-all of assorted projects with no clearly defined long-range plan for research.

"The new Democratic Administration will press forward with our national space program in full realization of the importance of space accomplishments to our national security and our international prestige."

ATOMIC ENERGY. "The United States became pre-eminent in the development of atomic energy under Democratic Administrations.

"The Republican Administration, despite its glowing promises of 'Atoms for Peace,' has permitted the gradual deterioration of United States leadership in atomic development both at home and abroad."

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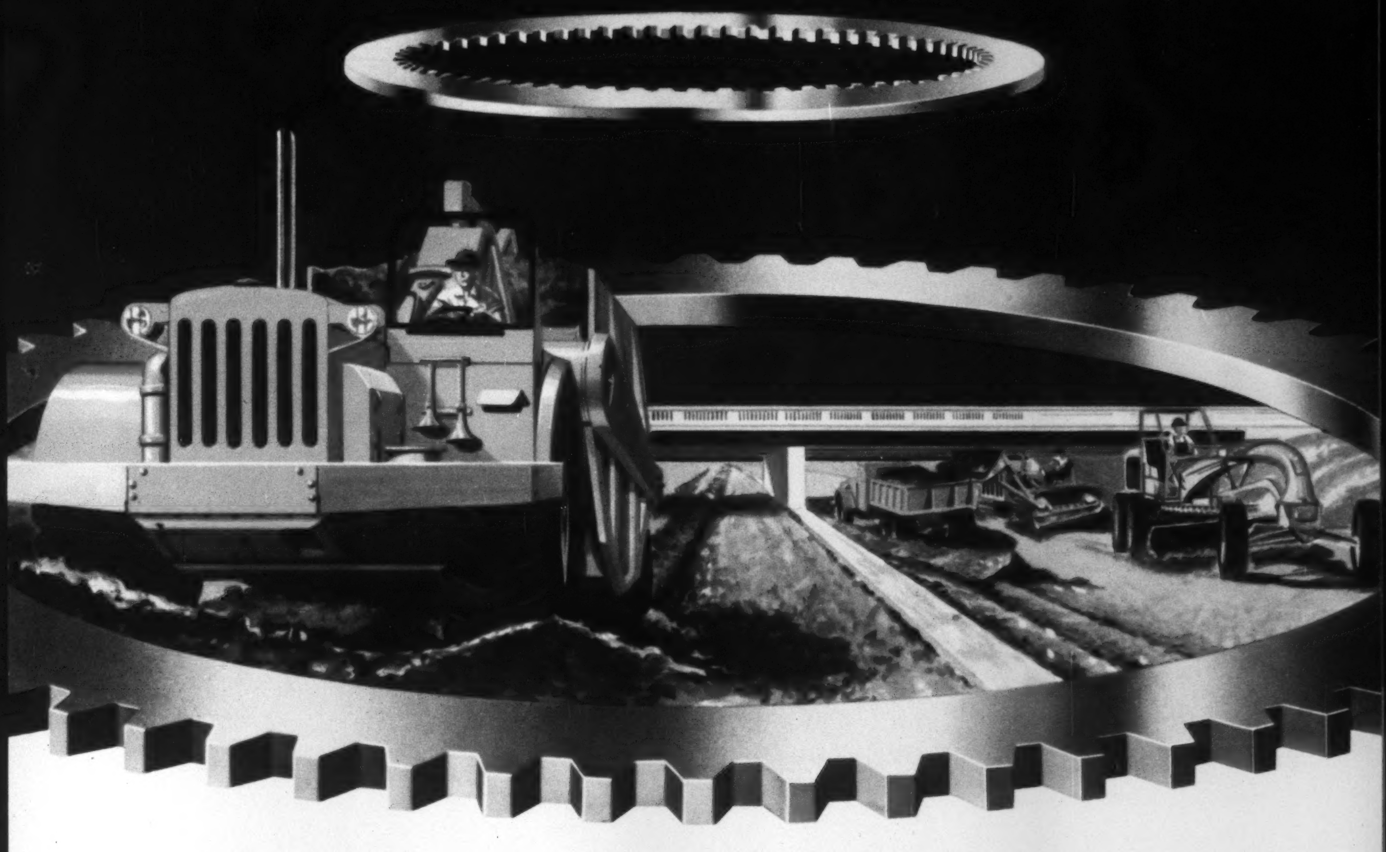


Ingersoll CROSS-ROLLED Clutch Steel
Helps Move the Earth

To meet the punishing demands of off-highway equipment, Ingersoll Steel Division melts, CROSS-ROLLS, and processes to customer specifications, special analysis clutch steel. In short, Ingersoll can:

- **Melt (electric furnace) steels to special analyses**
- **CROSS-ROLL ingots to sheet and light plate**
- **Blank or shear**
- **Produce rings with internal or external teeth**
- **Rough and/or finish grind the surfaces**

Ingersoll clutch steel is also widely used in the automotive and tractor industries.

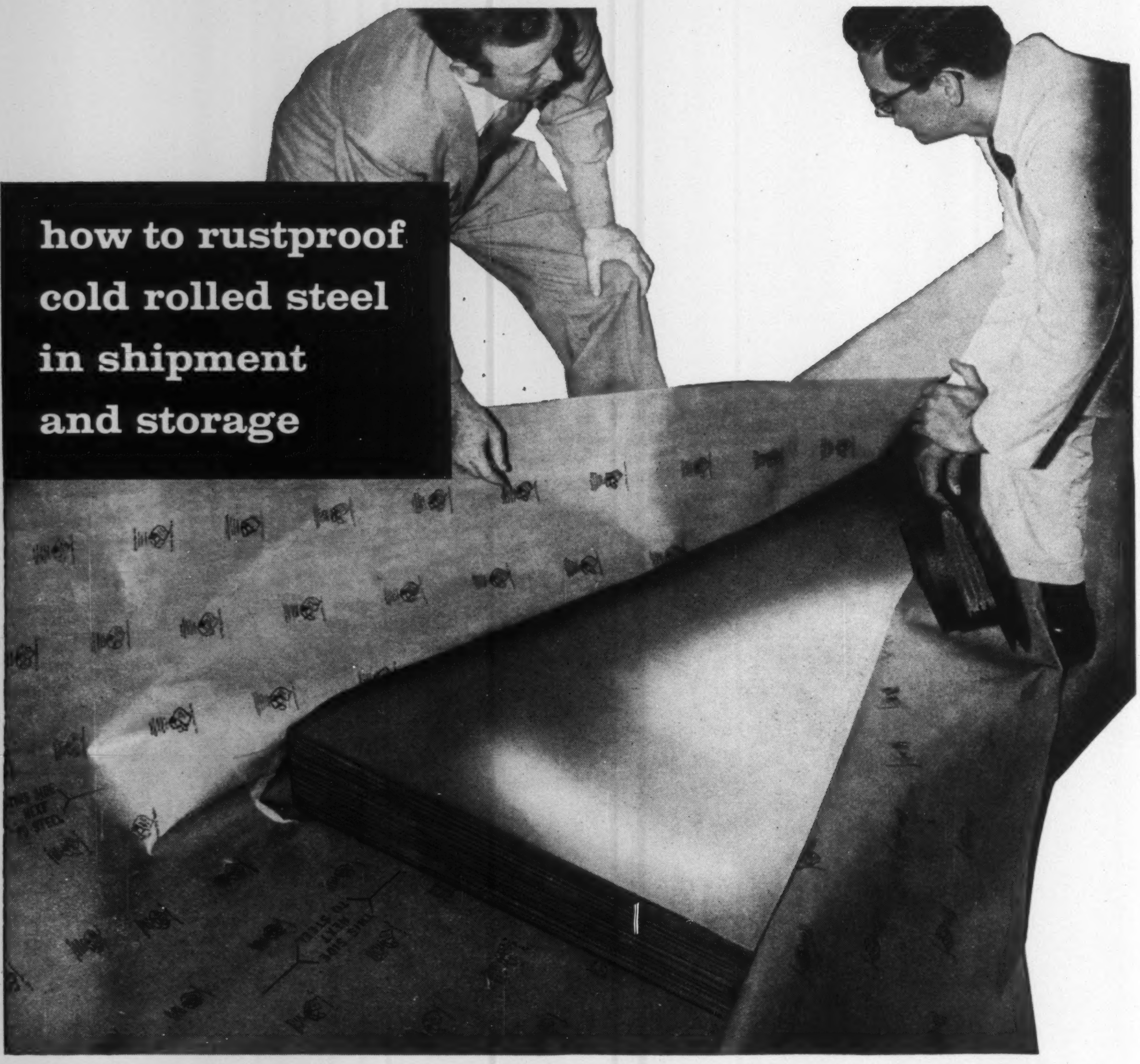
Write for Ingersoll's new full-color facilities and products brochure: "Experts in Specialty Steels."

Ingersoll's gear shapers, hobbing machines and surface grinders produce precisely finished clutch plates to customer specifications.

INGERSOLL
B-W
STEEL

Ingersoll STEEL DIVISION
Borg-Warner Corporation
NEW CASTLE, INDIANA

how to rustproof cold rolled steel in shipment and storage

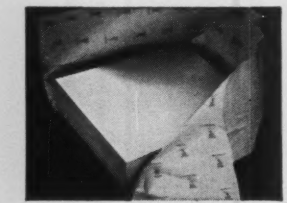


Proved by actual test! Unwrapped steel rusted within a few hours. Identical steel wrapped in Ferro-Pak showed no signs of rust . . . even after several months. Non-toxic chemical vapors from Ferro-Pak coat the steel with an invisible film that makes it impossible for rust to get the slightest foothold.

Even under adverse conditions, such as outside storing or shipping, Ferro-Pak provides complete protection. It is waterproof, strong, yet highly flexible and easy to handle. The chemical rust inhibitor is compatible with oil and stays effective for long periods even when the humidity soars.

Whether you're a shipper or a buyer of steel, it will pay you to specify Ferro-Pak wrapping wherever rust is a problem. For an interesting idea brochure on many uses for Ferro-Pak, write Cromwell Paper Company, 180 N. Wabash Ave., Chicago 1, Ill. Dept. A10.

How to rustproof a freight car—Ferro-Pak is used to line sides of car and to interleave coils, transforming ordinary freight car into huge rustproof package.



How to rustproof black plate—On this light gauge, dry, uncoated steel, rust can start from a fingerprint. Ferro-Pak keeps black plate rust-free even when the humidity soars!

FERRO-PAK®
by Cromwell

For over 38 years—
"Paper Engineers" for Steel

Detroit Stands Pat on Prices

First word from the automakers is that 1961 cars will cost no more than 1960 models.

In some instances cars will have more equipment than last year and cost less.—By A. E. Fleming.

▪ From Detroit last week came the first mention of 1961 car prices. The word is: No price increase.

The six automakers which announced prices are representative of the industry. They included low, medium and high price names ranging from the compact Valiant to the Cadillac.

Some of them even reduced prices. When this news was revealed, marketing specialists at rival companies which had not yet announced their own pricing strategies quickly went to work at their computers to find out whether the "hold the line" move is genuine or whether it is due to optional equipment manipulation, a trick of the trade in past years.

They say the stand-pat on prices is the real thing this year. In some cases manufacturers are offering more car for the money than in 1960. This is something unique for a rival to admit, even in confidence.

Reverse Trend—In recent years it has not been uncommon for a car producer to take a piece of equipment off the optional list, an automatic transmission or deluxe trim package for example, and make it standard equipment on a new model. The price of the new model would be raised accordingly to compensate for the new equipment. But the car producer would claim the price was identical to a "comparably equipped" old model. This is not happening much this season. The reverse is true in some cases.

The medium priced Oldsmobile for one, according to a competitor who made a check, through equipment additions is giving $8 to $9 more car for the money on Series 88 models than it did last year. Olds factory list prices are exactly the same as 1960.

Price Drop—A similar case is the Plymouth Valiant which has made some interior equipment changes to increase the value of the car. Nevertheless in an attempt to make the Valiant a bigger seller, to make it more of a price competitor with Falcon and Corvair, Valiant costs were dropped $36 on the lowest priced four-door sedan. A new two-door sedan, available for the first time, costs $56 less than the four-door.

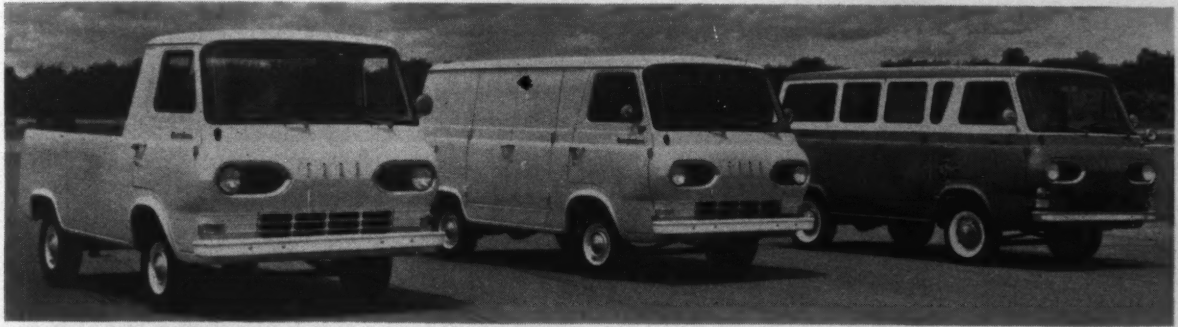
The fact that carmakers are not raising prices is amazing to no one in Detroit. There was nothing to hook a price hike onto. Moreover, there is talk of recession.

Unknown Market — Automakers are wary. They are finding it rough to figure out how many cars they will be able to sell in the October-December months. Layoffs are already around the corner. Chrysler Corp., first to get started on 1961 car production, has already stocked its dealers adequately and will lay off 5000 factory workers Oct. 4.

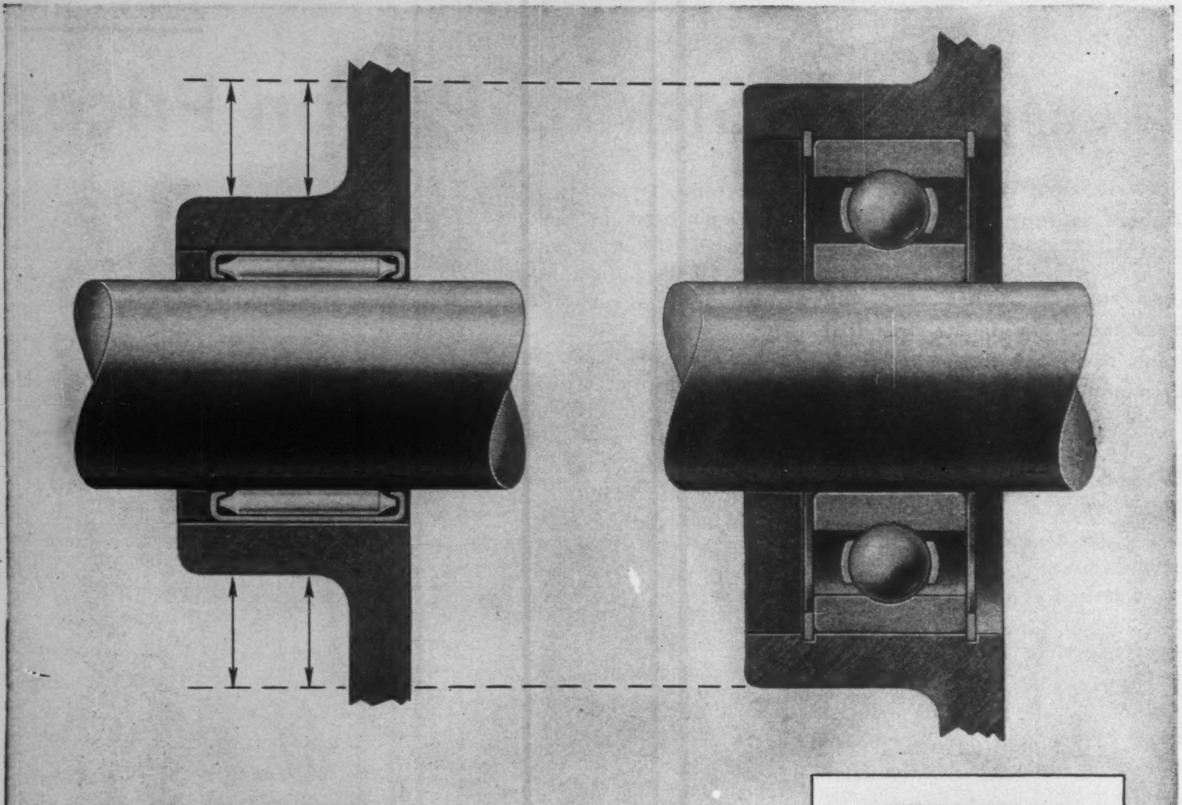
Then, too, steel prices have stood still and there are not many people who are looking for an increase during the rest of 1960. Finally, tooling costs were not too great this year for the industry as a whole.

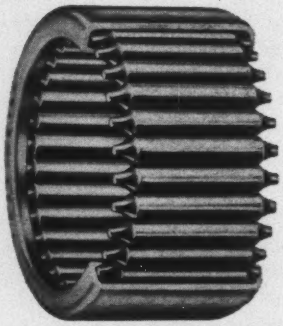
GM spent quite a bit to bring out its new Buick, Olds and Pontiac compacts. In the past a big outlay of GM has generally meant a higher price tag on its cars. But this isn't so this year, and seems to indicate that GM, usually the leader rather than follower in auto pricing, may think the current car market simply cannot absorb a price boost.

Ford Offers New Competition to Imports



NEW LINE: Ford's new Econoline commercial vehicles are offered in three models, a pickup, van, and eight-passenger bus. The motor mites are 168.4 in. long, nearly 2 ft shorter than Falcon stationwagons.





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- Run directly on hardened shafts
- Permit use of larger and stiffer shafts

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Simpler, more compact design is possible wherever Torrington Needle Bearings are put to work in eliminating friction problems.

These outstanding bearings offer a higher radial load capacity than any other bearing of comparable size. They are more compact, lighter in weight, and are lower in unit cost. The full complement of small-diameter precision rollers insures exceptional antifriction performance and long, maintenance-free service life. The turned-in lips on the outer shell guarantee positive roller retention. Installation and assembly are fast, simple, economical.

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Gas Appliance Market Grows

Metalworking Will Share Industry's Expansion

A stepped-up demand for metalworking's goods and services will follow growth of the market for gas appliances.

Farwest appliance makers plan larger plants within next five years.—By R. R. Kay.

▪ What's the best way to share in the huge Farwestern gas appliance market? And what's the outlook?

Gas appliance makers there have big plans to boost production. This means a stepped-up demand for metalworking's goods and services.

Big Boost By '65—Here are some highlights of a special poll made for The IRON AGE. It covers 78 important members of the Gas Appliance Manufacturers' Section of the Pacific Coast Gas Association. The firms are in California, Oregon, Washington, Utah, Nevada, Arizona, Hawaii, and British Columbia.

The opinion was unanimous for a really big jump in business by 1965. One large firm plans a 100 pct boost in both dollar volume and number of units. In fact, several companies predict their business will more than double within five years.

Larger Plants Coming—Another manufacturer, who sells only in the region, looks for a 50 pct hike. And he believes he'll do it within his present marketing area.

Most of the companies polled say they'll need larger plants within five years. A few are already on the move. One 50-year-old firm is now building a new plant. Others are modernizing and putting in cost-saving equipment.

Far western gas appliance makers are an important factor on the national scene. Only a few serve just their regional market. Most of them sell their products all over the country.

Market Plans—Next year they plan to capture an even larger share of the market. How? With new designs. They have a solid reputation for setting the pace in styling.

What's the outlook for this year?

The Farwest will produce and sell some 10 pct of the nation's gas appliances—2.4 million units for $243 million. That's up from last year's 2.25 million units for $200 million. These figures don't include the healthy market for allied equipment such as controls, fittings, and pipe.

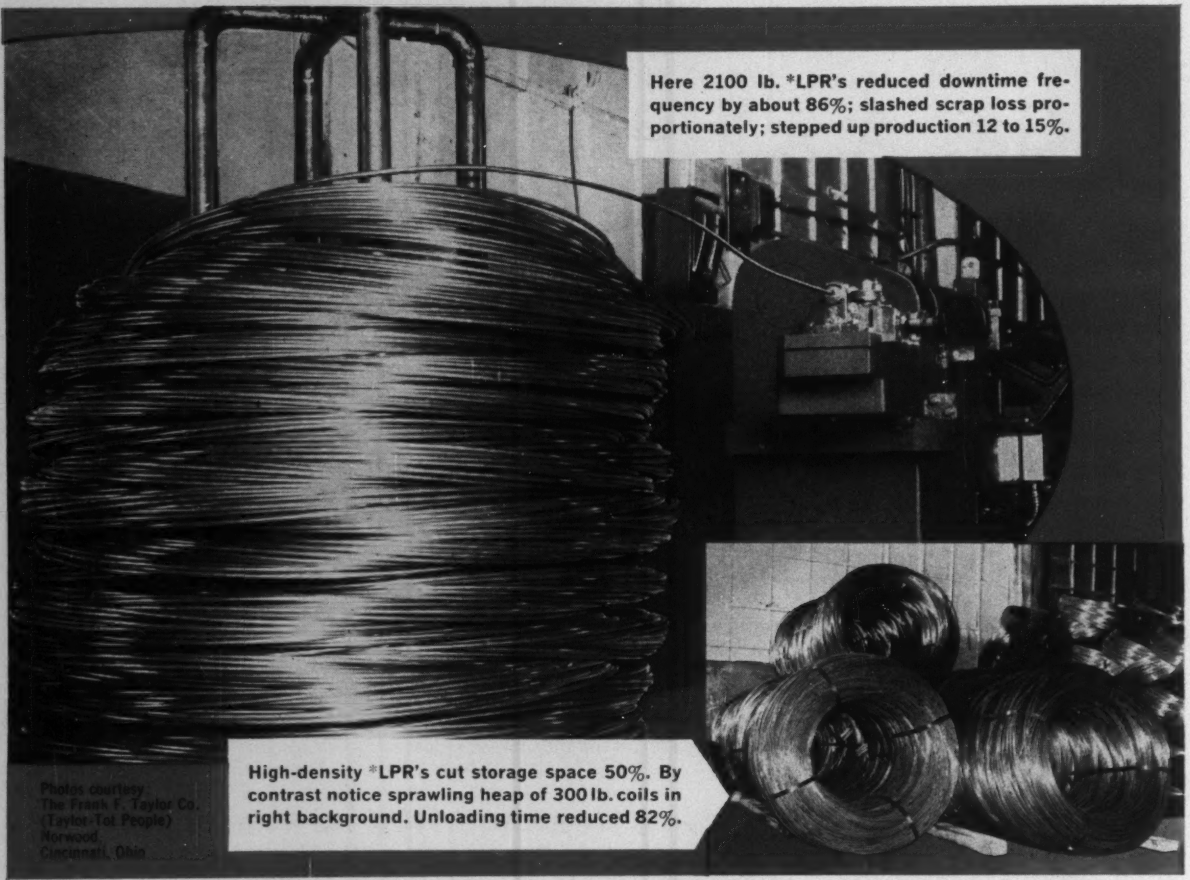
What does this huge Farwestern industry mean to metalworking firms across the country? If you're not selling gas equipment makers, you'd be wise to take a good hard look. If you are selling them, you may have to reappraise your marketing plans.

Metalworkers just can't afford to overlook this field.

New Headquarters for Kaiser Interests

KAISER CENTER
MURPHY BUIL

OAKLAND LANDMARK: New 28-story office building in Oakland, Calif., is headquarters home for the 60 affiliated Kaiser companies. Building is the main structure in seven-acre Kaiser Center development.



Here 2100 lb. *LPR's reduced downtime frequency by about 86%; slashed scrap loss proportionately; stepped up production 12 to 15%.

High-density *LPR's cut storage space 50%. By contrast notice sprawling heap of 300 lb. coils in right background. Unloading time reduced 82%.

Photos courtesy
The Frank F. Taylor Co.
(Taylor-Tot People)
Norwood
Cincinnati, Ohio

Brite wire fabricators report these savings from DSC-PORTSMOUTH Long Production Run

*LPR COILS

HIGH-DENSITY *LPR's weighing from about 1200 to 4200 lbs. cost no more than comparable gauge and grade brite wire in traditional 150 to 400 lb. bundles. *But see what they save you in fabricating.*

***LPR's FEED UP TO 28 TIMES MORE WIRE PER SET-UP** —in single-length run—eliminating up to about 95% of production stoppages due to coil changes and set-up adjustments . . . They shrink your downtime, minimize your coil-remnant scrap.

THEY INCREASE YOUR NET OUTPUT per man-hour or per shift; cut your unit fabricating costs; save material. They widen your manufacturing margin, strengthen your competitive position.

WHAT'S MORE . . . high-density packaging (greater weight per cubic foot) conserves your storage space; makes your coil stock more accessible; sharpens your inventory control; cuts your handling time, expense and effort in shifting bundles from unloading platform to stock room—to production floor—to machine. Rids you of bothersome returnable carriers and small coil racks.

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Will August Pickup Start a Trend?

Builders Look for Order Increase in Coming Months

August machine tool orders made a nice recovery from the dip registered in July.

And industry executives believe the recent Exposition will lead to an upswing in domestic orders.—By R. H. Eshelman.

▪ With the Machine Tool Exposition now history and the August sales figures tabulated, what is the outlook for a fall pickup? That's the big question as marketing executives sit down to assess their situation in a shifting business scene.

On the plus side is the good rise in orders for August. Net new orders for metal cutting machines are up to a total of $49.45 million. This is a nice rise from July which, was down to $33.5 million. March was the only previous month this year to come near this.

No Trend — In metal forming equipment net new orders were down to $8.1 million from $9.45 million. Shipments of cutting machines were $3 million below July, $36.45 million in August against about $39.5 for the previous month. Metal forming tool shipments held about even at $10.7 million.

Since there's no conclusive trend evident since April, merely a sawing back and forth, industry spokesmen say they must look to September, and perhaps on into October. It's been pointed out frequently that without the strong support of foreign orders the tool picture for the year so far would be bleak indeed. Nearly a quarter of new orders so far this year have been for overseas plants.

Don't Count On It—Much of the foreign buying has been for automotive plants, and also American subsidiaries or affiliates opening operations in foreign markets.

Trade experts and machine tool executives who have been abroad recently point out that foreign orders can't be counted on as a regular thing. Support for a fall or winter rise must come from American industry.

There's considerable optimism that the Machine Tool Exposition has supplied the impetus needed. One leading controls group counts up at least 68 orders for numerical contouring equipment. Though perhaps not typical, it's one of the signs that numerically operated tools are at last ready to move.

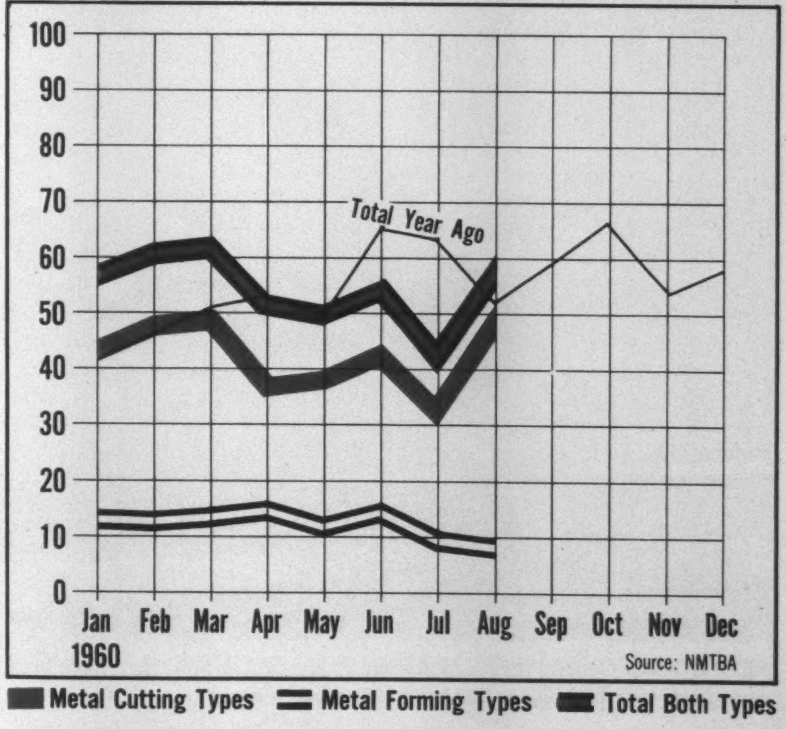
Show Business—President of the National Machine Tool Builders Assn., Allan Mattison, is confident that the show will trigger a lot of orders. He notes that heavy capital equipment isn't bought on the spur of the moment. Some weeks may be needed before reports of manufacturing executives to top management begin to be felt.

Virtually all exhibitors agree that show visitors were impressed with great improvements in metalworking equipment. And Mr. Mattison believes that weight of this expert opinion could break the dam of orders. It would not be too optimistic to look for the rise to approach 50 pct, he feels.

MACHINE TOOLS-NET NEW ORDERS

In Millions of Dollars

Metal Cutting and Forming Types



INDUSTRIAL BRIEFS

Build for Refractories — Corhart Refractories Co., Louisville, Ky., will build a plant at Buckhannon, W. Va., for the manufacture of refractory materials. Construction will begin immediately on a 30-acre site. Manufacturing operations are expected to begin by next spring. Corhart is a wholly-owned subsidiary of Corning Glass Works.

Research in Mexico—Kaiser Refractories & Chemicals Div., of Kaiser Aluminum & Chemical Corp., is building a technical center at Mexico, Mo. The center will house research and technical personnel and the division's clay research staff and raw materials group. It will be equipped to test and evaluate material in connection with the development of fireclay, silica and high alumina refractories.

Design in Brass—The Copper & Brass Research Assn. has launched its third annual copper and brass achievement awards. First prizes will be given in two separate categories. They are Industrial and Architectural applications of copper, brass, bronze, or other copper-base alloys. Nominations must be submitted before March 31, 1961. Information can be obtained from CBRA, 420 Lexington Ave., New York 17, N. Y.

Plant for Plymouth—A new plant to be built at Winamac, Ind., will operate as the Plymouth Tube Co., a division of Van Pelt Corp. The parent company was founded in 1920 as Service Steel Co. and incorporated as Van Pelt in 1951. It was founded as a warehouse operation specializing in steel tubing. Plymouth Tube was started in 1924 for manufacturing cold-drawn carbon and alloy steel tubing.

Ryerson Occupies New Building

NEW ROOM: General offices of Joseph T. Ryerson & Son, Inc., have been moved into new building at 2621 W. 15th Place, Chicago.

English Cousins — National Broach & Machine Co., Detroit, is forming an associate company in England to serve British, European and world markets. It will manufacture, sell and service Red Ring gear production equipment, super-precision ball screws, and precision boring heads. Precision Gear Machines & Tools Ltd. is located at Coventry, England.

Gets Liquid Wheel — The Fenn Mfg. Co., Newington, Conn., manufacturers of metal forming machinery, has acquired the Liquid Wheel Machine Co., Indianapolis. Fenn has also obtained sole-rights to manufacture a patented and unique machine for deburring metal parts.

Steam on Credit — Boiler users can now lease new boilers or buy them through installment payments under two plans. This service of leasing and time-payment plans is being offered by Boiler Engineering & Supply Co., Phoenixville, Pa. The company builds Continental automatic package boilers of 15 to 600 hp for industrial, commercial, and institutional service.

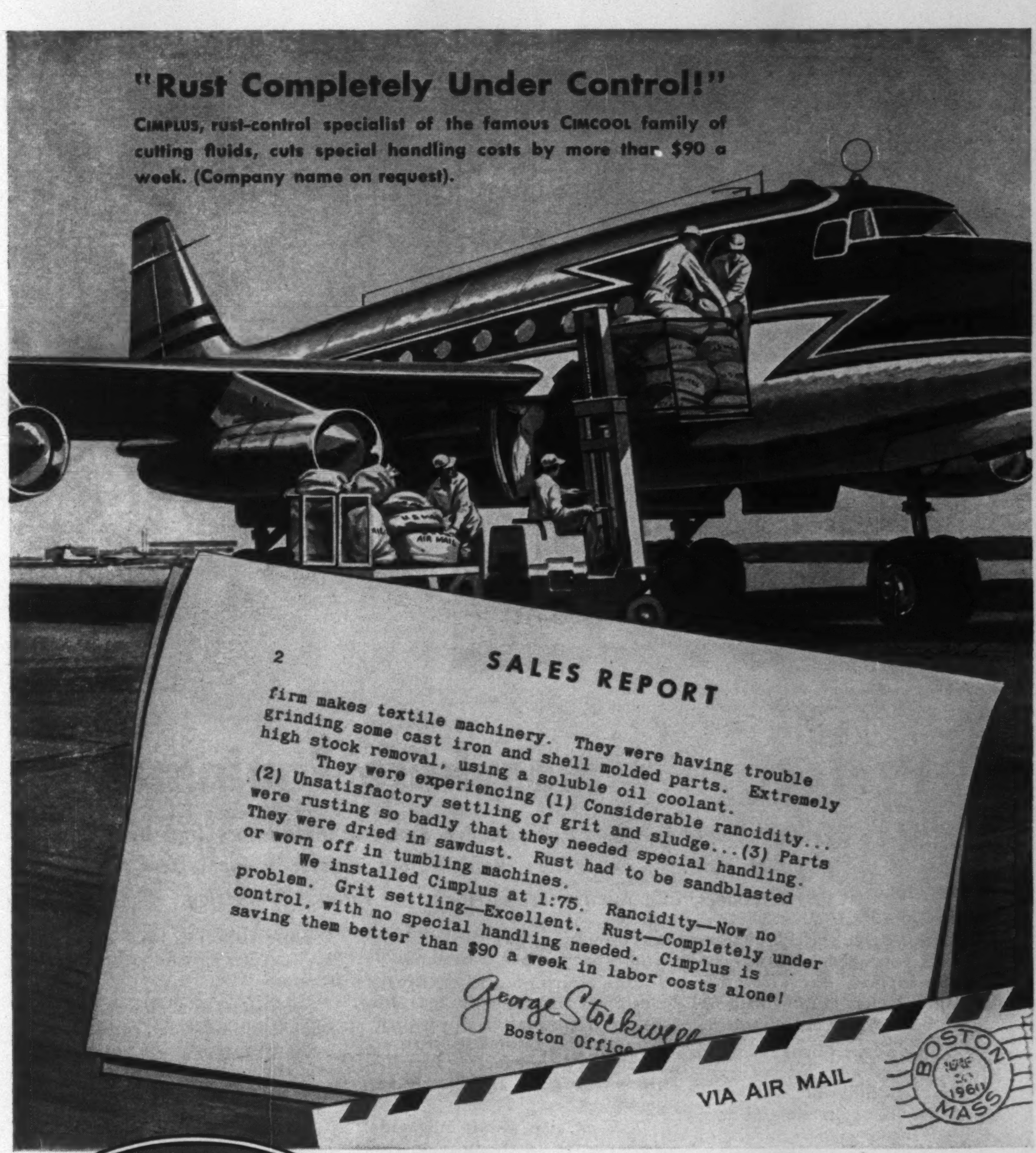
AISE Officers—C. E. Pritchard, Alan Wood Steel Co., is the new president of the Association of Iron & Steel Engineers. H. L. Jenter, American Steel & Wire Div., U. S. Steel Corp., was elected 1st vice president of AISE, and C. W. Bruce, Republic Steel Corp., will serve as 2nd vice president.

Rolling Along — Acquisition of American Steel Rolling Mills, Inc., Long Beach, Calif., by Barush-Foster Corp., of Dallas, will speed completion of a new automated reinforcing steel mill. Under construction at 6375 Paramount Blvd., Long Beach, the mill is expected to be in operation by January, 1961.

Electrical Wire—A new research laboratory to serve the electrical industry will be built in Fort Wayne for Rea Magnet Wire Co., Inc. The project calls for completion in 1961. Rea also has operations in Lafayette, Ind., and is a subsidiary of Aluminum Co. of America.

"Rust Completely Under Control!"

CIMPLUS, rust-control specialist of the famous **CIMCOOL** family of cutting fluids, cuts special handling costs by more than $90 a week. (Company name on request).



2

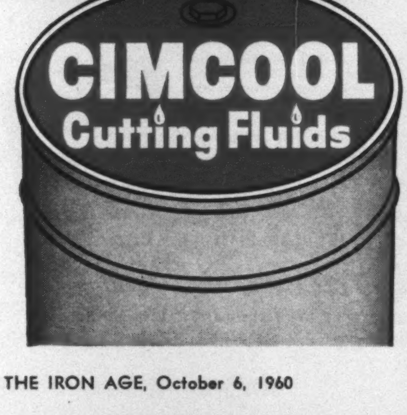
SALES REPORT

firm makes textile machinery. They were having trouble grinding some cast iron and shell molded parts. Extremely high stock removal, using a soluble oil coolant.

They were experiencing (1) Considerable rancidity... (2) Unsatisfactory settling of grit and sludge...(3) Parts were rusting so badly that they needed special handling. They were dried in sawdust. Rust had to be sandblasted or worn off in tumbling machines.

We installed Cimplus at 1:75. Rancidity—Now no problem. Grit settling—Excellent. Rust—Completely under control, with no special handling needed. Cimplus is saving them better than $90 a week in labor costs alone!

George Stockwell
Boston Office



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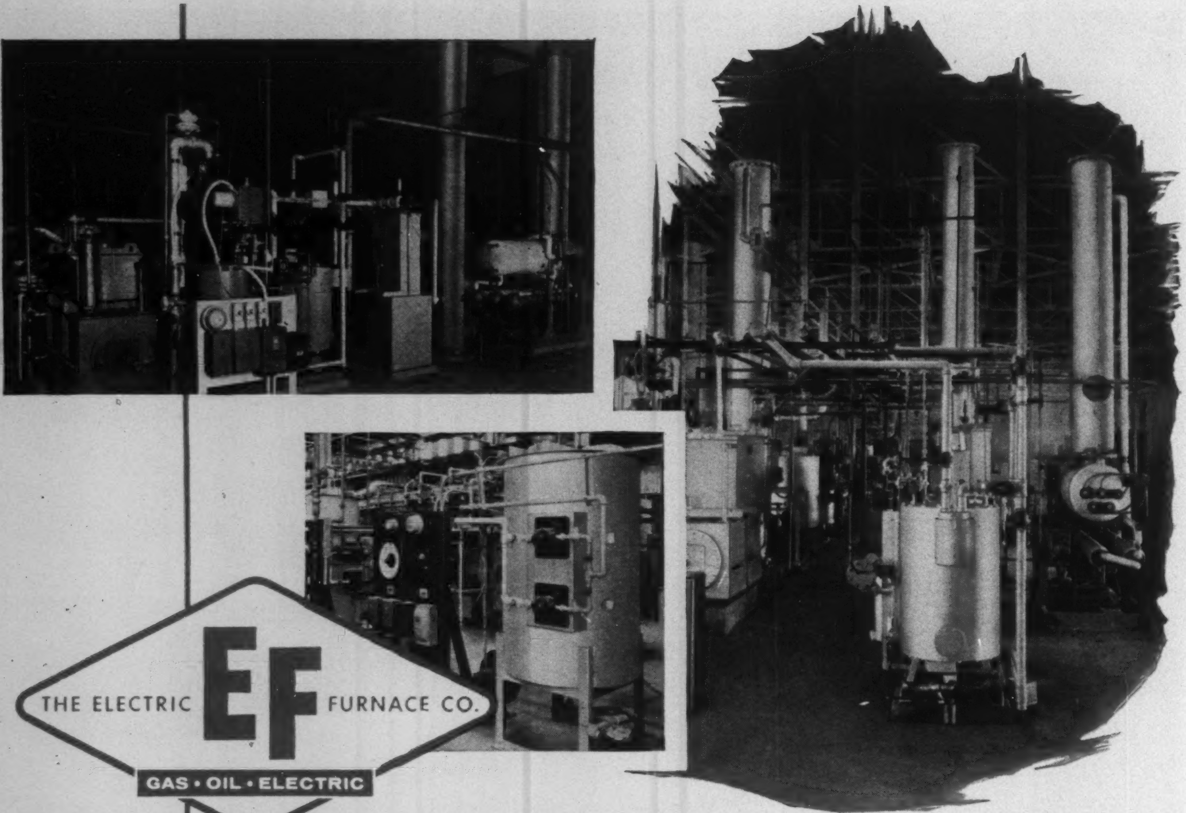
CIMPLUS — The transparent grinding fluid which provides exceptional rust control.
CIMCUT Concentrates (AA, NC, 55) — For every job requiring an oil-base cutting fluid.
ALSO — CIMCOOL Tapping Compound — CIMCOOL Bactericide — CIMCOOL Machine Cleaner.

For full information on the complete family of CIMCOOL Cutting Fluids, call your CIMCOOL Distributor. Or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

°Trade Marks Reg. U. S. Pat. Off.



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Our equipment is skillfully designed and ruggedly built for long, dependable operation. Completely automatic. Proven in hundreds of exacting installations. Sizes for any hourly capacity.

Ask us also about our wide experience in designing and building roller hearth, wire mesh belt, car bottom, roller rail, catenary, bulkhead tray, walking beam, bell, pit, rotary, screw and other types of furnaces for annealing, normalizing, galvanizing, coating, carburizing, brazing, sintering, billet heating, malleablizing and other heat treatments.

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Dr. William A. Pennington

He's the New ASM President

A widely varied career in the field of metallurgy brought Dr. Pennington to the post of president of American Society of Metals.

It culminates a period of 25 years' service to the Society.

- Dr. William A. Pennington, the 41st president of the American Society for Metals, assumes his new post after many valuable and active years in the field of metallurgy and in the Society.

His career has been widely varied, but in a sense he has returned to his starting point. Dr. Pennington began his career as a student of chemistry at Union University, Jackson, Tenn. After graduation he attended Iowa State College where he received his doctorate in physical chemistry and metallurgy in 1933. And today he is a professor of metallurgy at the University of Maryland.

In Between—But the years in between were far from inactive. After Dr. Pennington received his doctorate he returned to Union as head of the mathematics department, a post he held for two years before leaving to join Armco Steel Co. It was at Armco where he began work on the decarburization of steel which he completed at Mellon Institute, Pittsburgh. There, he was an industry fellow in charge of the National Radiator Foundry Practice Fellowship. The work on decarburization was recognized in 1947 when he was awarded the ASM Henry Marion Howe Award.

After four years at Mellon Institute, Dr. Pennington joined the Carrier Corp. at Syracuse, N. Y. At Carrier he invented Refrigerant 500, the only commercial azeotropic (constant boiling) refrigerant in use today. He is also the inventor of an absorbant refrigerant combination suitable for applications in air conditioning, using an air-cooled absorber and an air-cooled condenser.

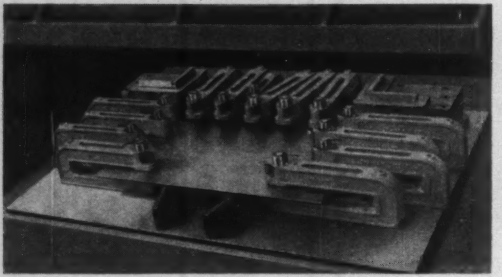
Stresses Importance — Now at the University of Maryland, Dr. Pennington takes a great interest in the future of American metallurgy. He feels that the importance of metallurgy to the welfare and security of the nation must be stressed. But first, he says, we must impress the adult population of this importance so they in turn might impress on the student the growing need for metallurgists in a world that every day is creating a greater need for men learned in the nature of metals.

DR. W. A. PENNINGTON: Metallurgy is vital.

A 25-year member of ASM, Dr. Pennington has served the Society actively and enthusiastically. In 1948 he was chairman of its Syracuse Chapter. He served a two-year term as treasurer from 1953 to 1955 and has just completed a term as national vice president. In addition, he has served on 15 ASM committees and has been chairman of 13 of these. He was a conferee to both World Metallurgical Congresses and to the joint meeting in Europe in 1955.

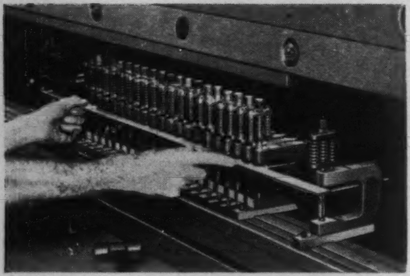
A Specialist—He has authored and co-authored 25 articles and papers in the fields of metals and chemistry, and has become an expert in metallurgical education specializing in ferrous metals.

In addition to ASM, he holds membership in Alpha Chi Sigma, American Chemical Society, American Institute of Chemists, American Institute of Chemical Engineers and the New York Academy of Sciences.

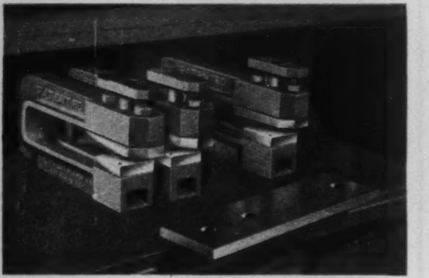


STRIPPIT eliminates expensive custom dies. Type "BL" Units used in press set-up save the time and cost involved in designing and building single-purpose dies. "BL" Units punch holes to 3.500" diameter in ⅛" material.

Cut costs with STRIPPIT Self-Contained Tooling

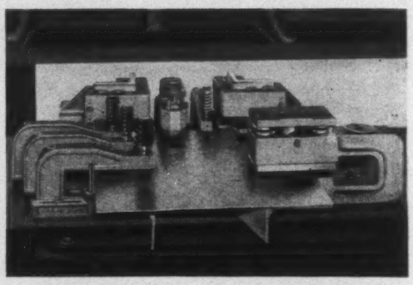


STRIPPIT lowers labor costs. Typical setup of Type "C" Units can be set up by any good bench man. No high-salaried tool and die makers needed. "C" Units punch holes to .3125" diameter in ⅛" material.

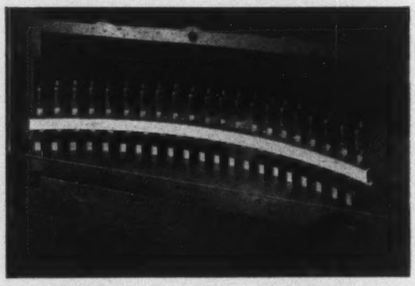


STRIPPIT shortens lead time . . . setup of Type "HS" Hydra-Strip Units shows ¾" thick punched piece in foreground. STRIPPIT tooling like this can be set up *immediately* after the pattern is O.K.'d.

STRIPPIT gives you a complete line (including notching and slotting units) from a single source. Nationwide sales and service is available through trained tooling methods engineers. Specify STRIPPIT, the original system of self-contained tooling. Write now for the new STRIPPIT General Catalog.

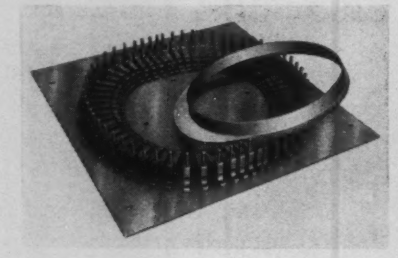


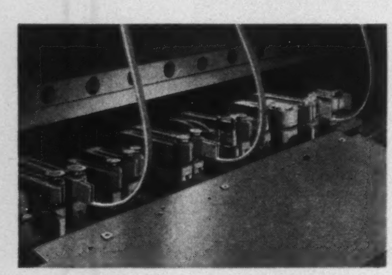
STRIPPIT assures minimum investment. "CJ" Units punch a variety of hole sizes to 3.500" diameter. Simply replace punches and dies! Re-using units reduces investment in idle dies, practically eliminates die storage problem.



STRIPPIT sets up faster, more accurately. Type "E" Units for punching holes in channels and shapes are permanently aligned. Pilot pin is concentric with punch to assure fast, accurate positioning on precision-drilled template.

STRIPPIT cuts press downtime. Type "H" Unit setup is ready to move into press as soon as previous run is finished. Nothing attaches to the press ram. Type "H" Units punch holes up to .500" diameter in ⅛" material.





STRIPPIT provides unlimited versatility. Type "BL" Pierce Nut Units punch and stake Fabristeel Multipierce Nuts, can emboss simultaneously. STRIPPIT units can be set up in any hole pattern and used over and over again.

A UNIT OF HOUDAILLE INDUSTRIES, INC.

WALES STRIPPIT INC.

202 Buell Road • Akron, New York

In Canada: Strippit Tool & Machine Company, Brampton, Ontario.

MEN IN METALWORKING

R. L. Frederick, elected vice president, International Divisions, The Timken Roller Bearing Co.

C. H. H. Weikel, named a vice president, Bethlehem Steel Co.

The Brush Beryllium Co.—**M. B. Nunlist,** appointed vice president, finance and administration.

National Engineering Co.—**E. C. Troy,** named vice president, sales.

E. J. Lavino & Co. — **A. R. Kasprisin,** appointed superintendent, Sheridan Blast Furnace plant.

Wheeling Steel Corp. — **H. C. Jackson,** appointed asst. superintendent, Cold Strip Dept., Yorkville Works.

Cooper Alloy Corp. — **S. F. Cooper,** appointed asst. general sales manager.

Buffalo Forge Co., Machine Tool Div.—**C. H. Locke,** appointed sales manager.

Dominion Steel & Coal Corp., Ltd.—**P. F. Bennett,** named general manager, Dosco's Montreal Works; **T. R. Jopling,** named general manager, Etobicoke Works.

American Metal Products Co., Automotive Div.—**A. A. Dolega,** appointed asst. controller.

Thompson Ramo Wooldridge, Inc., Dage Television Div.—**W. G. Gordon,** appointed general sales manager and asst. division manager.

The Timken Roller Bearing Service and Sales Ltd.—**A. B. Clarkson,** named manager.

A. O. Smith Corp., Electric Motor Div.—**W. A. Joubert,** appointed Western district manager.

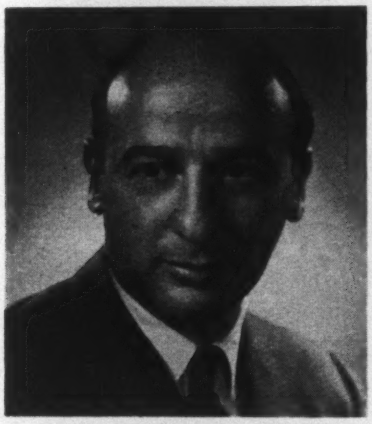
Morse Chain Co.—**R. J. Koch,** appointed Southwest regional sales manager.

Hyster Co. — **J. P. Greer,** appointed manager, retail branch in Chicago; **W. C. Harmon,** named Midwest regional manager.

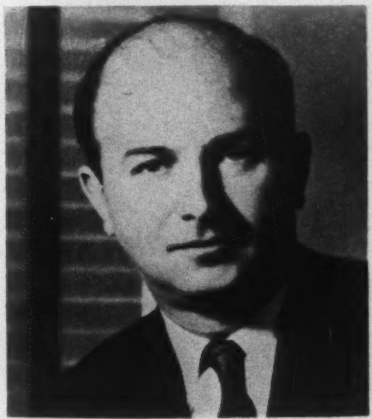
Air Reduction Sales Co.—**D. F. Bovie,** appointed asst. manager, engineering services, Pittsburgh district.

Minneapolis - Honeywell Regulator Co. — **J. K. Lincoln,** named sales manager, Micro Switch Div., Freeport, Ill.; **R. F. Johnson,** named central area (Cleveland) sales manager, Micro Switch Div.; **K. J. Cumming,** promoted to sales manager, Marion Instrument Div., Manchester, N. H.

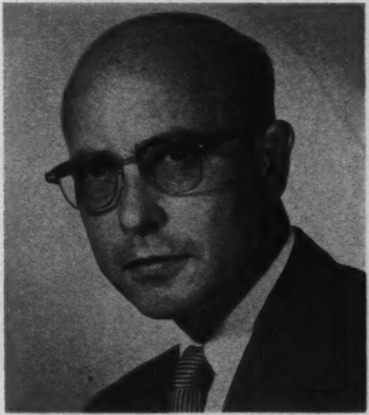
Industrial Div., Aeroquip Corp. —**Bingham McClellan,** promoted to Asst. OEM sales manager; **Robert Friedlund,** named training director and special asst. to the general



C. S. Ablon, elected executive vice president, Luria Bros. & Co., Inc.



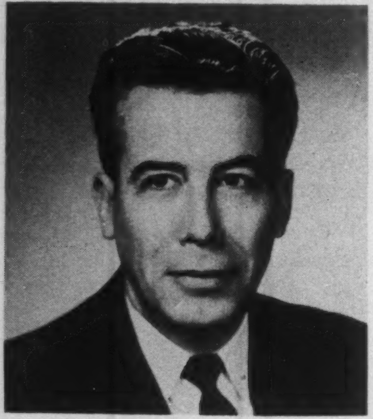
H. D. Wallach, appointed vice president and general manager, Howe Refining Co.



H. F. Wiley, named a vice president, Consolidated Electrodynamics Corp.

THE HOUGHTON LINE
COOLANTS FOR METALWORKING
HYDRAULIC FLUIDS AND PACKINGS
CLEANERS
RUST PREVENTIVES
QUENCHING OILS & HEAT TREATING SALTS
DRAWING COMPOUNDS
SPECIALTY LUBRICANTS
ON-THE-JOB SERVICE

sales manager; **Dan Collins,** named an account executive, OEM accounts, Cleveland territory; **Robert Rigali,** promoted to sales engineer, Ohio territory; **Sherman Arnold,** promoted to service parts sales engineer, Wisconsin territory.

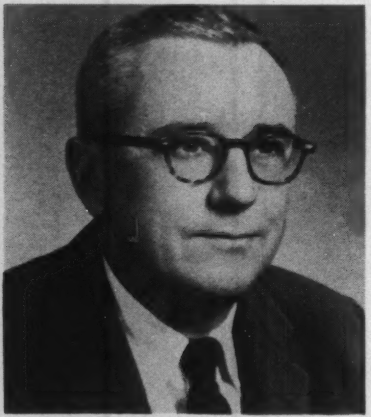


M. D. Ford, named general manager, manufacturing services, Armstrong Cork Co.

Garlock Inc.—**E. J. Verity,** appointed manager, Marketing Research Dept.

Systems Engineering & Manufacturing Co.—**E. H. Hoffman,** appointed manager, General Fabrication Dept.

EMCOR Ingersoll Products Div., Borg-Warner Corp.—**D. R. Carlson,** appointed Division sales supervisor; **E. P. La Kaff,** appointed chief engineer.



G. C. Strubell, appointed director, metallurgy and research, The American Brass Co.

F. H. Ramage, appointed manager, sales, Pipe Div., Republic Steel Corp.

Koppers Co., Inc.—**P. D. Shollar,** vice president—procurement, and **W. F. Alexander,** director of procurement, have been transferred to the office of the president; **J. D. Rice,** named director, procurement.

Norden Division, United Aircraft Corp.—**J. C. J. Hebron,** appointed sales manager, Ketay Dept., Commack, Long Island.

The Black & Decker Mfg. Co.—**J. L. Turnbaugh,** appointed manager, Towson, Md., plant.

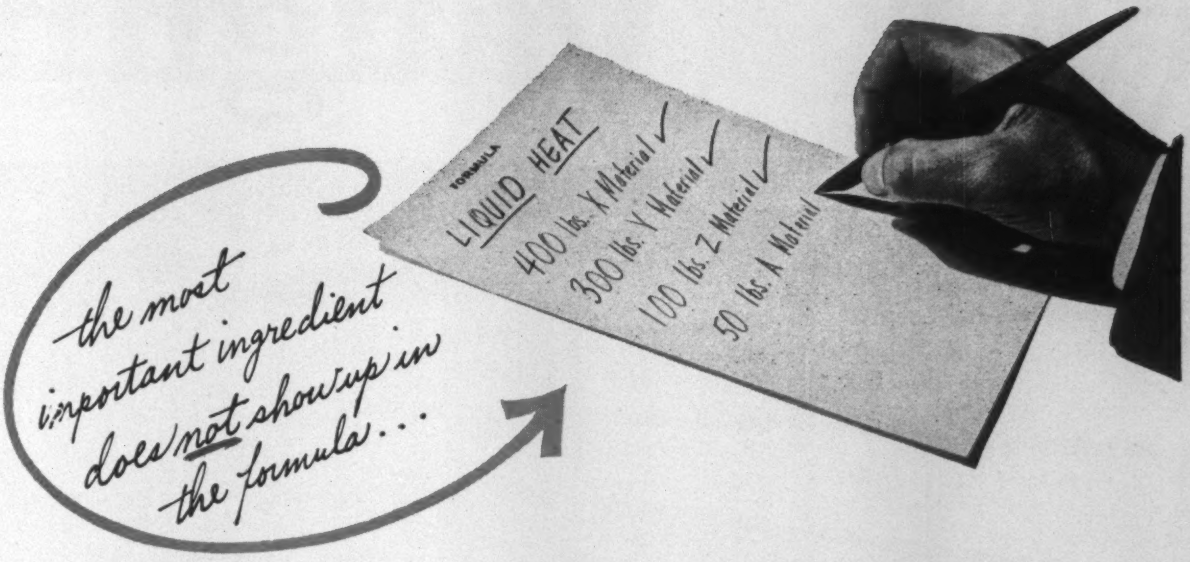
L. J. Synk, appointed asst. chief metallurgist, Steel and Tubes Div., Republic Steel Corp.

Square D Co., Marketing Div.—**R. W. Thompson,** appointed general sales manager.

Pittsburgh Metallurgical Co., Inc.

(Continued on P. 162)

HOUGHTON Liquid Salt Baths


the most important ingredient does not show up in the formula...
FORMULA
LIQUID HEAT
400 lbs. X Material ✓
300 lbs. Y Material ✓
100 lbs. Z Material ✓
50 lbs. A Material

HOUGHTON SELLS HEAT TREATING RESULTS

"Shirt-sleeve" service, on your job and in your plant, goes with every Houghton salt you buy. A team of specialists is added to your heat treating staff—men who are backed up by many years of experience and the most extensive research facilities in the business. It is their job to see that you get the heat treating results you want, no matter how difficult the assignment.

Ask the Houghton Man how you can get fast, uniform metal treatment, batch after batch. He'll recommend the salt you need—for tempering, martempering, annealing, quenching, carburizing, nitriding, normalizing and hardening of metals. And he'll stay on the job till you get the results you want.

This extra Houghton service is yours for the asking. Just talk to your Houghton Man or write direct to E. F. Houghton & Co., 303 West Lehigh Ave., Philadelphia 33, Pa.

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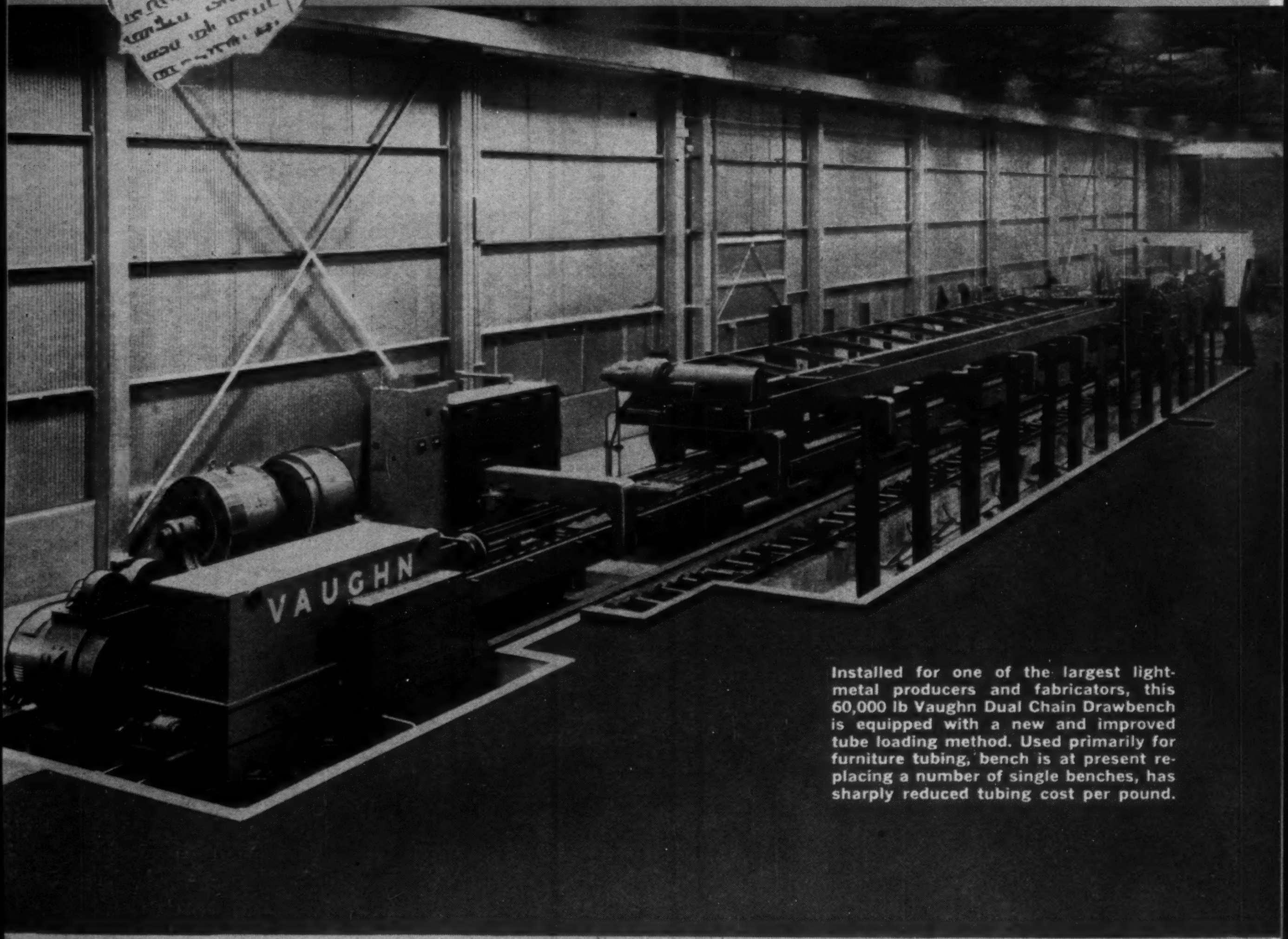
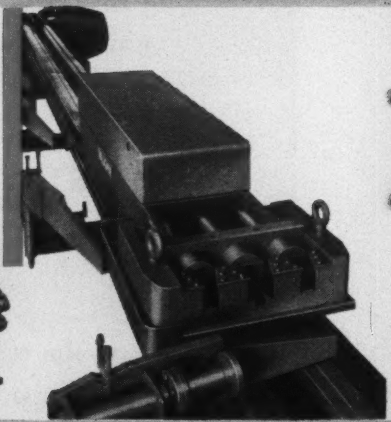
In the NEWS

Vaughn®



Installed for one of the largest light-metal producers and fabricators, this 60,000 lb Vaughn Dual Chain Drawbench is equipped with a new and improved tube loading method. Used primarily for furniture tubing, bench is at present replacing a number of single benches, has sharply reduced tubing cost per pound.

This Vaughn Bench pulls 60,000 pounds for an Illinois steel and wire producer. Bench points and draws three — 1¼" bars simultaneously.



Air-operated carriage and skid arm, equipped with push-off, on Bench shown at left. Carriage has shock absorbers for each bar operating independently.

Drawbenches

• NEW DESIGNS • HIGHER SPEEDS

• Finer Cold Drawn Production!

Vaughn Machinery Company—builders of the world's most complete line of cold drawing equipment—is proud to present advanced new Drawbench models for tubes, bars, and shapes.

Available in double and single chain types, these latest Vaughn Benches employ totally new loading concepts that permit drawing five tubes at a time *and more.*

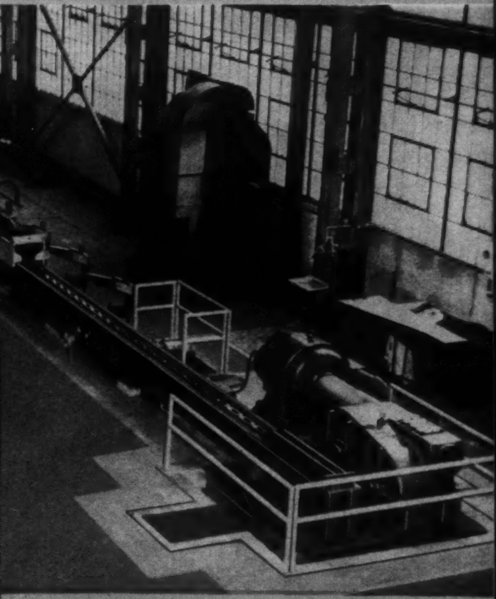
Vaughn dual chain benches now in operation are drawing tubing up to 550 fpm—straighter tubing! In fact, generally higher speeds are now feasible with a new chain design which permits high speeds without lubrication problems.

New "floating" foundation design reduces installation and foundation maintenance costs. Many additional refinements contribute to Vaughn leadership in modern drawbench performance. Consult your Vaughn engineer on your cold drawing problems.

The Vaughn Machinery Company, Cuyahoga Falls, Ohio, U.S.A.

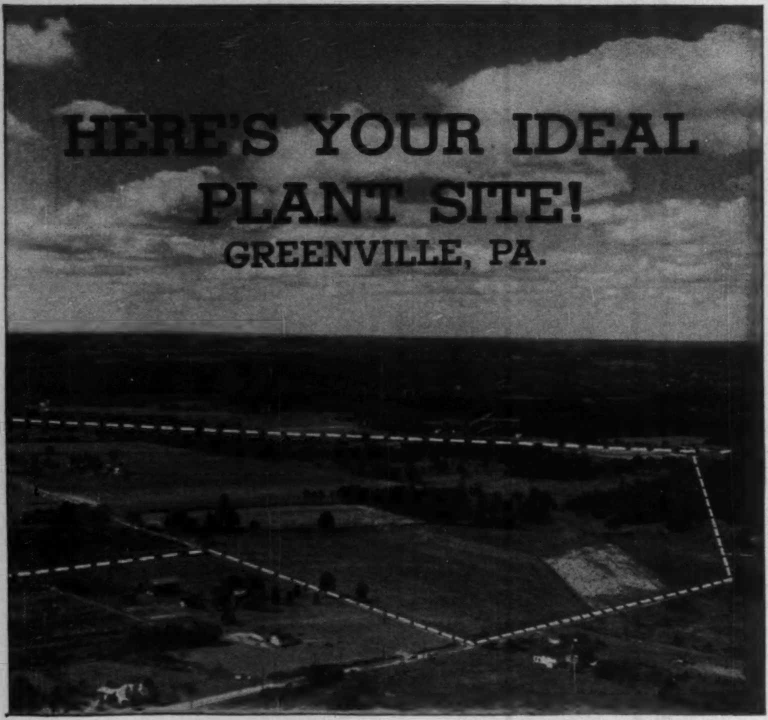
If it's Cold Drawn see **Vaughn**

COMPLETE COLD DRAWING EQUIPMENT—Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

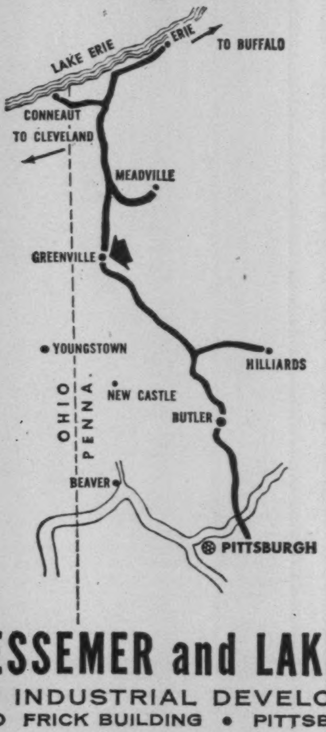


▲ For another Illinois producer, this Vaughn Drawbench is equipped for bars, tubes and shapes. It is used primarily for shaving magnesium on a production basis.

◀ Installed at a large Canadian tubing producer, this Vaughn Drawbench includes roll-over mandrel end, carriage tube shock unit and air clutch. Canada's largest-ever order for copper tubing was recently drawn by this bench.


HERE'S YOUR IDEAL PLANT SITE!
GREENVILLE, PA.

Attractive, Level, Flood-Free Land Close to Metropolitan Markets of Pittsburgh, Cleveland and Buffalo


LAKE ERIE
ERIE
TO BUFFALO
CONNEAUT
TO CLEVELAND
MEADVILLE
GREENVILLE
YOUNGSTOWN
HILLIARDS
OHIO
PENNA.
NEW CASTLE
BUTLER
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This adaptable 750 acre plant site is ideally located adjacent to Greenville, Pa., and is only 80 miles from Pittsburgh and Cleveland; only 150 miles from Buffalo. Next day rail delivery to these points.

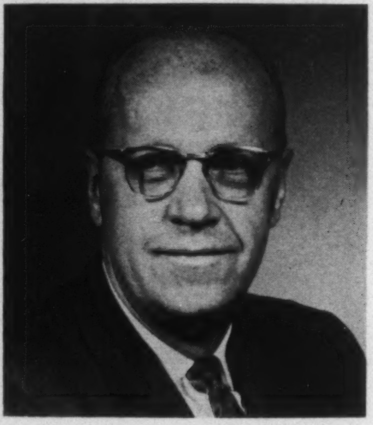
Extensive deposits of coal, limestone, clay and aggregates nearby. Steel and other basic materials available with 24-hour delivery service.

Investigate today! Write or phone for *location factors* of this site.

BESSEMER and LAKE ERIE RAILROAD CO.
INDUSTRIAL DEVELOPMENT DEPARTMENT
1830 FRICK BUILDING • PITTSBURGH 30, PA. • ATLANTIC 1-4780
The Bessemer Man is at your "Site Service"

(Continued from P. 158)

— **T. E. Dann,** appointed plant manager, Calvert City, Ky., plant; **W. J. Bernat,** appointed general superintendent, Charleston, S. C. plant.



W. W. Edens, appointed asst. director, Research Division, Allis-Chalmers Mfg. Co.

J. G. Sauer, appointed manager, sales, Refractomet Div., Universal-Cyclops Steel Corp., Bridgeville, Pa.

Wilkerson Corp.—**G. K. Bogert,** named manager, manufacturing, Englewood, Colo.

Morris Machine Works—**C. M. Sloat,** appointed works manager.

OBITUARIES

D. K. Martin, 55, sales manager, steel mill equipment, Surface Combustion Div., Midland-Ross Corp.

E. H. Beyhl, 63, sales engineer, Mining Div. of Traylor Engineering & Manufacturing Div., Fuller Co.

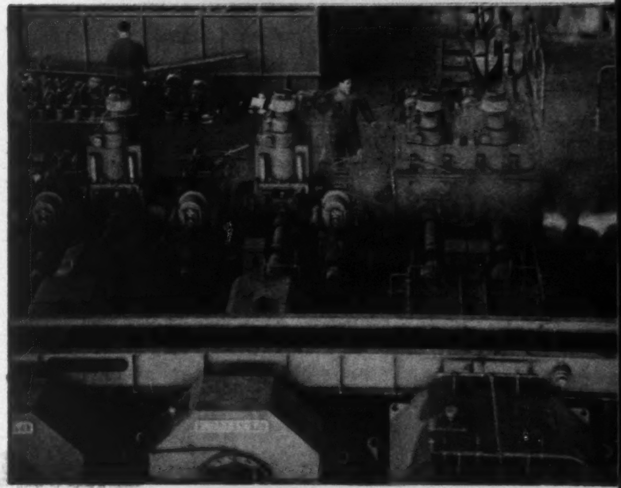
INNOCENTI

mechanical division

continuous mill

for the manufacture of seamless steel tubes and pipes

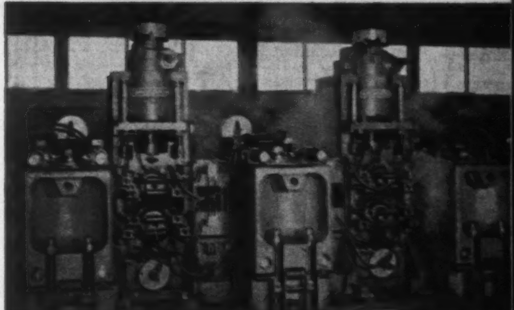
The Continuous Mill associated with the Stretch Reducing Mill in the double version for making tubes from $^{3}/_{8}$" to 3" and from 2.$^{3}/_{8}$" to 7" successfully meets present requirements for consistently higher quality and quantity.

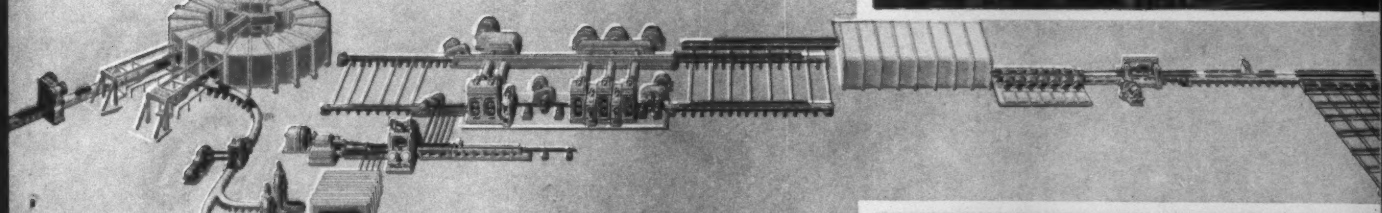


- Highest Capacity: the annual production can reach respectively 150,000 and 250,000 tons in the two versions.
- Highest yield: 93% - from billet to tube
- Complete automation: 1,5 man hour per produced ton
- Possibility to make tubes up to 18 mm with 2,25 mm minimum thickness without stretching
- Extremely easy to operate
- Low installation costs in respect of capacity.

These features make the Continuous Mill the most reliable tube making equipment for new installations or the modernization of the existing ones.

INNOCENTI





Continuous Mill in operation at DALMINE S.p.A. works in Costa Volpino, Italy

INNOCENTI

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Via Pitteri 81 - tel. 23-93
Head Office, offices and factory
ROMA
Via Parigi, 11 - tel. 487-051
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Uganda House
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BECAUSE YOUR TEST NEEDS ARE DIFFERENT!

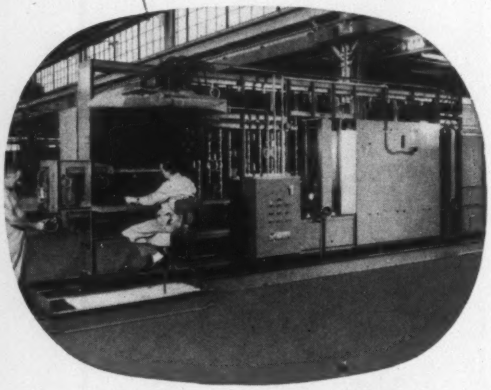
...from MAGNAFLUX you can find many engineered nondestructive test systems*, to meet widely different needs...as near as your telephone.

Only the widest *range* of test systems can assure you of getting the one *best* answer to your own "different" test problem. Several examples of the many ⋈ tests are shown at work on the next page.

The intensive problem-knowledge of the Magnaflux Field Engineer goes to work for you immediately. He qualifies as an impartial, expert counsel because he has thorough training in practically all wide-used nondestructive test systems. (Actually, we offer scores of systems, methods, test services, instruments and custom-engineered units. Magnaflux originated most of 'em and has been improving them ever since.)

Further, he wires you into more nondestructive testing know-how than you're likely to find anywhere else. He's backed, for instance by many hundreds of man-years of experience in field application and of design and project engineering. *Plus* a big department-full of far-reaching research. *Plus* the up to the minute knowledge gained in operating our own fifteen Commercial Testing Centers in principal cities, where the "unusual" tests occur almost daily to meet hundreds of differing needs and specifications.

At Magnaflux you find maximum nondestructive testing assistance—in equipment, men and experience-based understanding of your needs and problems. May we put it all at your service—SOON? Phone your local Magnaflux Field Engineer, or write us. Magnaflux Corporation, 7302 W. Lawrence Avenue, Chicago 31, Illinois.



TESTING BEARING CAGES with ZYGLO fluorescent penetrant. This Zyglo ZA-49, equipped with an endless conveyor, provides mechanized, high volume testing of nonmagnetic parts from ¾" to 10" in diameter. All processing is fully automatic, assuring predetermined control and repeatability of results.

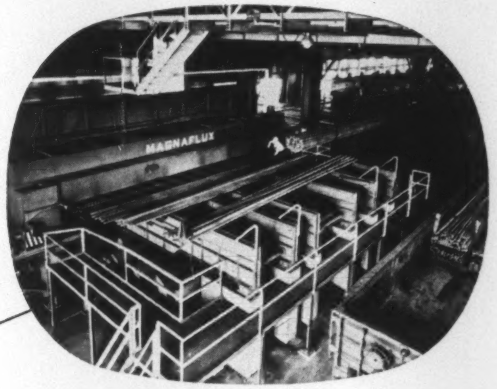
MAGNAFLUX CORPORATION

General Mills

TEST SYSTEMS

A SUBSIDIARY OF GENERAL MILLS

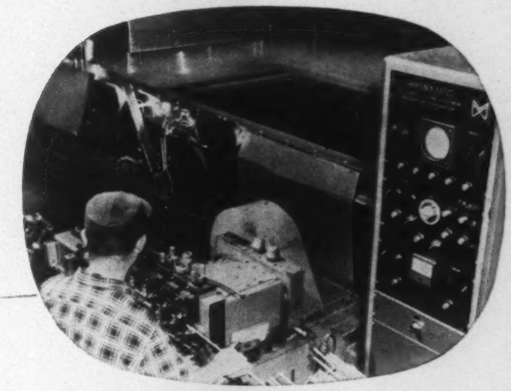
*MX test systems include MAGNETIC PARTICLE, FLUORESCENT PENETRANT, THERMOGRAPHIC, EDDY CURRENT, ULTRASONIC, STRESS ANALYSIS, RADIOGRAPHIC TESTING, DYE PENETRANT & MAGNETIC FIELD



A Few of Thousands of ⋈ Test Installations at Work—Could One of Them Help You?

BILLET CONDITIONING SYSTEM

Mechanized, ⋈ engineered inspection and handling provides more control, better quality level, and lower costs from conditioning. MAGNAGLO, electronic eddy current, ZYGLO fluorescent penetrant testing, for billets, tube rounds, welded and seamless tubing and pipe.

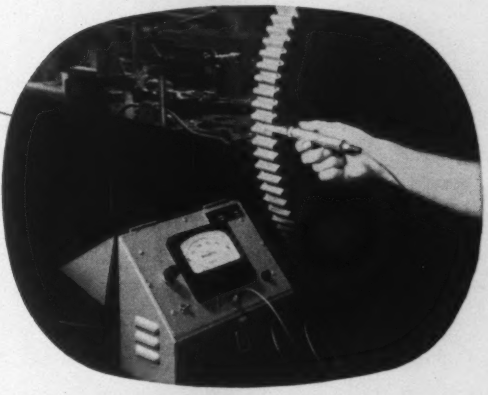


TESTING COPPER TUBING ELECTRONICALLY

with MAGNATEST FW-400, for cracks and seams at production speeds. Many kinds of MAGNATEST instruments, hundreds of applications: determining metal properties, defects, characteristics, sorting, etc.

TESTING THICKNESS ULTRASONICALLY

for core shift of castings, or almost any solid material, from .025″ to 3.00″, for thickness, corrosion, etc., from one side only. Portable transistorized SONIZON SO-300 gives instant dial readings, accurate to ±1%. Magnaflux Field Engineer instructs in operation (above).



TESTING JET ENGINE

turbine wheels electronically for serration cracks, with MAGNATEST ED-500G, eddy current instrument. Magnatest units measure relative depth of cracks, electrical conductivity, evaluate metals for all sorts of basic or process-built characteristics.

RADIOGRAPHIC TESTING

of boiler tubes with gamma radiation isotope. X-ray and gamma radiography service available at several locations. Performed by certified technicians and engineers at your plant or at your local ⋈ Commercial Testing Center.

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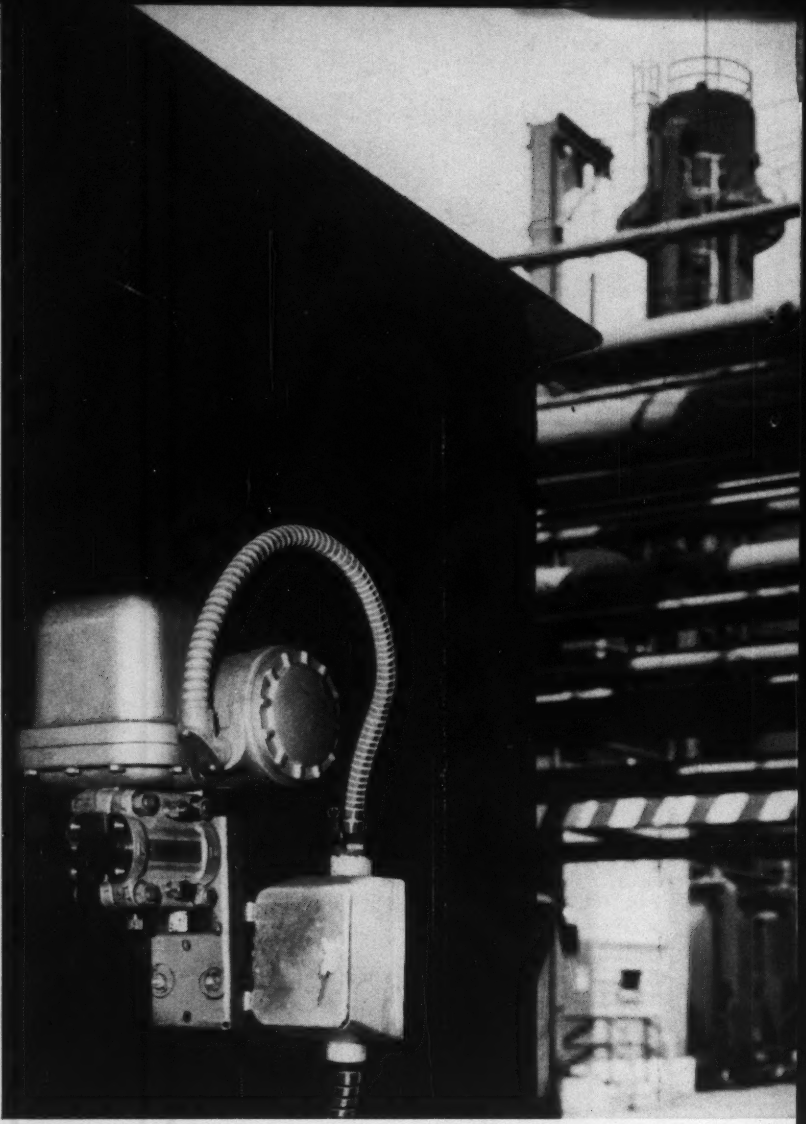
Foxboro electronics help giant steel mill "optimize" distribution of utilities

Water, gas, steam, power, oxygen — it takes all types of utilities to operate a modern steel mill. And any improvement in the efficiency of their distribution can reap a rich harvest in savings.

Foxboro Electronic Consotrol* instruments are helping one major producer reap just such a harvest. Dozens of Foxboro Electronic Transmitters scattered over the giant steel mill, flash pressure, level, and flow variables to a central, computer-directed, dispatching control center. As the computer figures optimum utility distribution, operators put it into effect.

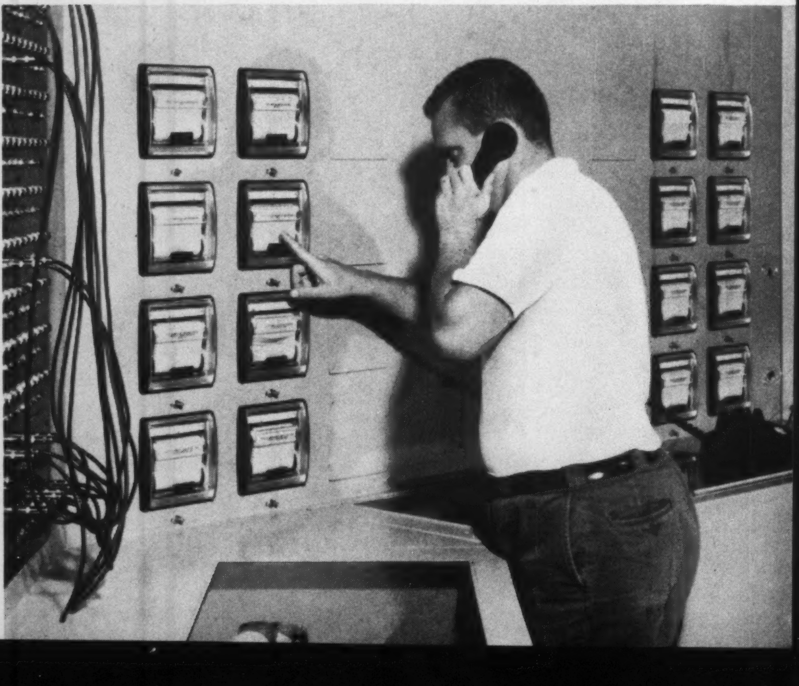
Foxboro Electronic Consotrol transmitters were a natural for the system. They transmit for miles, instantaneously — over a simple pair of unshielded wires. No field power supply is required. Their 10-50 ma d-c signal serves as input for both computer and Consotrol recorders. And since components are all solid-state there is no problem of maintenance.

Foxboro Electronic Consotrol instruments cover the entire control loop. Transmitters, receivers, controllers, valve operators—everything needed for today's most advanced control techniques. Ask your Foxboro Field Engineer for complete details. Or write for Bulletin 21-10, The Foxboro Company, 8010 Neponset Avenue, Foxboro, Mass. **Reg. U. S. Pat. Off.*



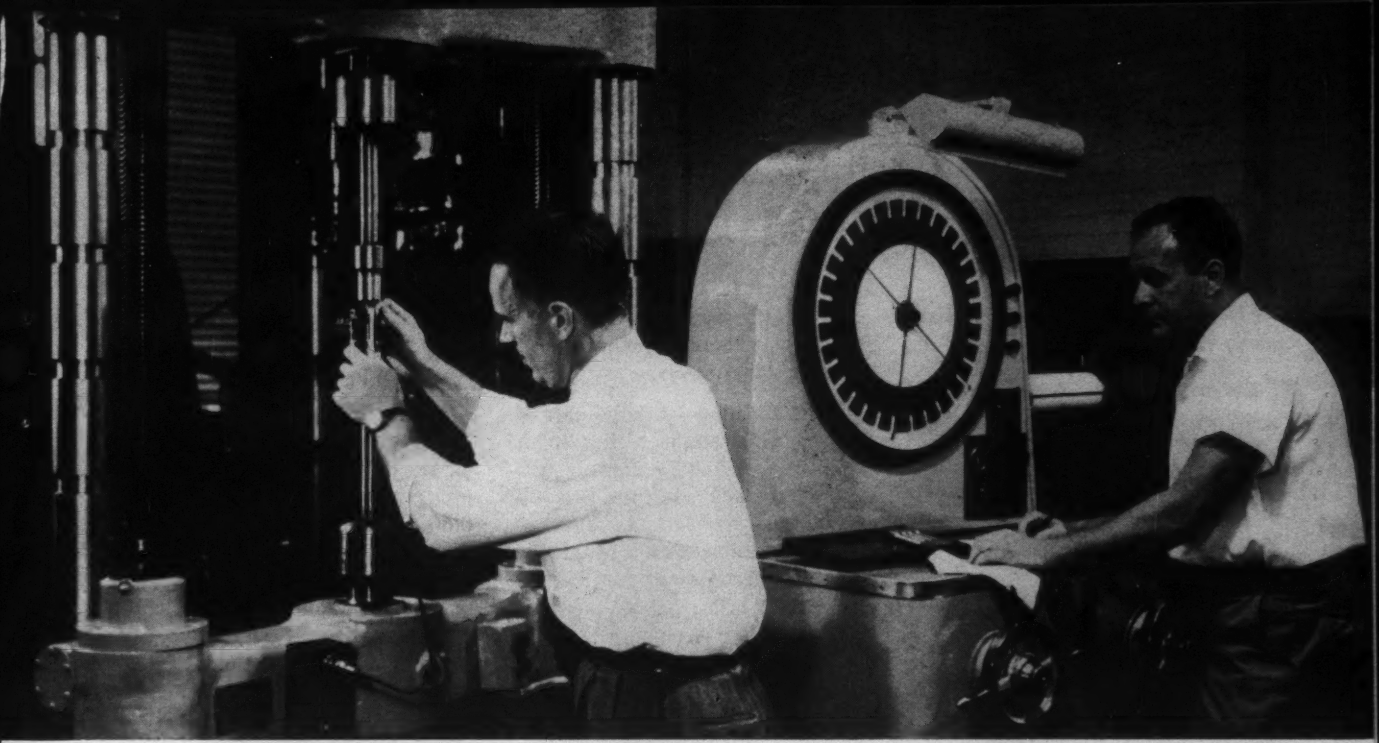
▲ One of 44 Foxboro Electronic transmitters flashing data to central dispatching station. Exclusive diaphragm construction prohibits transmitter from being damaged by overrange.

Foxboro Electronic Consotrol recorders at central dispatching station, are "plugged" in only when computer typewriters show an upset. Switchboard allows 16 recorders to cover 44 different transmitting stations. ▶



FOXBORO

REG. U. S. PAT OFF



Bethlehem Steel Co.

High-Strength Steels

■ Ask a group of metalworkers for a definition of high-strength steels and chances are you'll get a variety of answers.

Much of the uncertainty can be laid to the many hundreds of steels developed in the last 20 years, and the vast number of jobs they are performing. Keeping up with the pace has not been easy.

Yet, many branches of metalworking are finding these metals to be the solution to their materials problems. Their use points up a rapidly growing trend.

Interest in high-strength steels is not centered solely in the aircraft and missiles fields. All types of equipment are being made to run longer, faster, and under greater loads. Structures are withstanding brutal service conditions. Smaller, but still strong, products are being designed.

Which family of high-strength steels is best for you? Is it the high-strength group with a yield strength of 50,000 psi? The superstrength steels? Or the ultrastrength steels?

Whatever your strength needs, these steels deserve close appraisal. Find out how they can serve you better.

How to Get More For Your Metalworking Dollar

No. 5 of a series

High-strength steels is the subject for this feature, the fifth in The Iron Age's 1960 Metalworking Dollar Series.

Other features include:

1. **March 3: Cutting Fluids**
2. **April 14: Numerical Controls**
3. **June 30: Metallic Coatings**
4. **August 25: Special Fasteners**
6. **December: Special Machining Methods**

What's a High-Strength Steel?

"High-strength steel" means many things to many people.

Let a rundown of the various strength groups pinpoint your selection.

By **C. L. Kobrin,**
Metallurgical Editor

▪ A steel needn't have a yield point of 200,000 psi to be rated as high strength. There's a high-strength steel for almost every application—whether it be a truck body or a missile body. Yield points can range from 50,000 psi and up.

What is a high-strength steel? What unique properties must it have? Which steels qualify for this rank? And, perhaps most important, why should a manufacturer switch to these metals?

Needs Defining—A large part of the confusion about high-strength steels is due to the hundreds of new steels developed over the last 20 years. And the lack of one accepted definition hasn't eased the problem.

The American Iron and Steel Institute (AISI) has taken a step towards untangling this snarl. It defines a specific group of structural steels by the label: high-strength low-alloy.

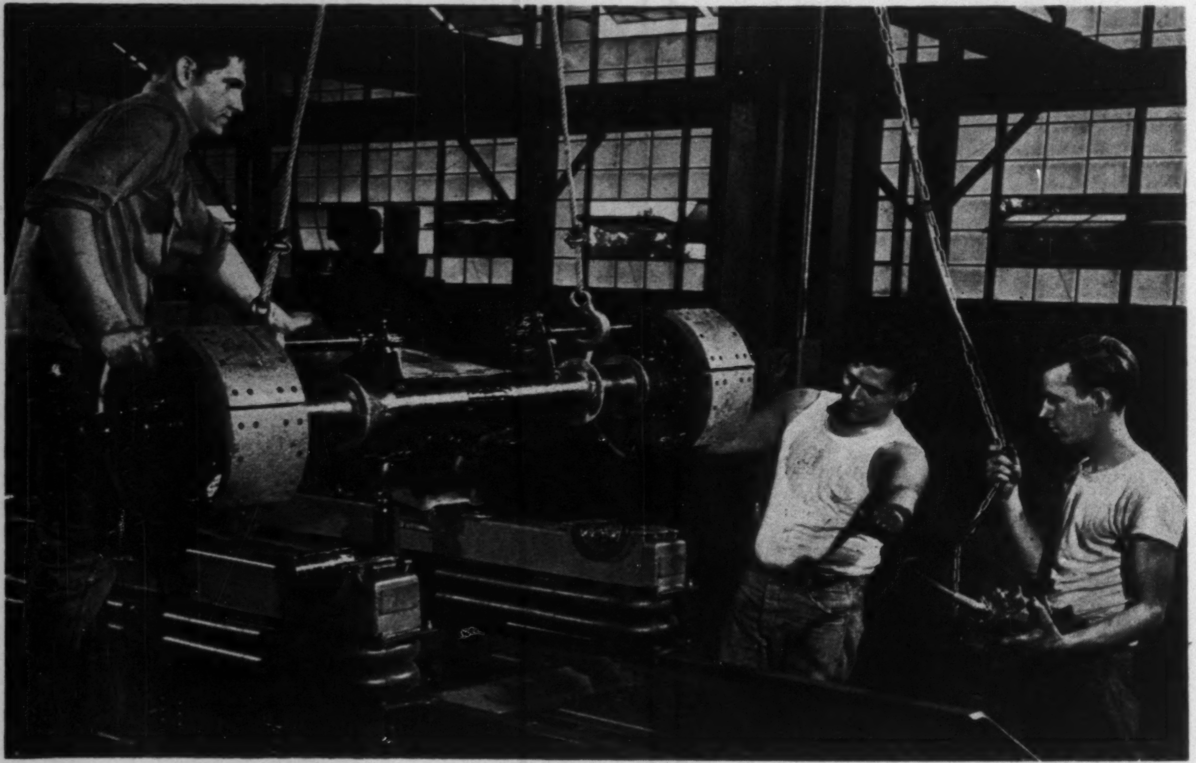
However, there are many high-strength steels that do not fall into this category.

There are two major steel classifications: carbon steel and alloy steel. Many of the high-strength steels, for example, are alloy steels.

Watch the Limits — Steel is known to be alloy steel when one of its alloying elements exceeds these limits: manganese, 1.65 pct; silicon, 0.60 pct; copper, 0.60 pct.

Steel can also be considered an alloy steel if it contains a definite amount of aluminum, boron, chromium (up to 3.99 pct), cobalt, columbium, molybdenum, nickel, titanium, tungsten, vanadium, zirconium or any other alloying element added to give a desired effect.

What are some of the effects of the alloying elements? Nickel, for example, provides deep hardening and improves toughness. When



Republic Steel Corp.

LOWERS COSTS ALSO: High-strength steel permits designing with lightweight components. Result: greater payload for rolling equipment. In production jobs, such metals earn respect by reducing downtime.

Added Features Spur Demand for Special Steels

- **Weight savings**
- **Greater payload**
- **Corrosion resistance**
- **Wear resistance**
- **Impact toughness**
- **Longer service life**
- **Reduced maintenance costs**
- **Less downtime**
- **Good weldability**
- **Thinner sections**
- **Good formability**
- **Simplification of design**
- **High temperature properties**
- **Pleasing appearance**
- **Good investment**

used with chromium, it enhances corrosion resistance. Chromium increases hardness and wear resistance. Molybdenum increases hardenability and forms stable carbides.

Carbon steels are old standbys. They make up the most important group of engineering materials and have the widest diversity of use. They exceed all other steels in tonnage produced. However, the minimum yield point, when meeting ASTM specification A-7, is only 33,000 psi.

Meets Structural Needs—Here's where the group known as high-strength steels enters the picture. These proprietary steels give industry greater strength in structures, and improved corrosion resistance. Yield strength is about 50,000 psi. Tensile strength is about 70,000 psi. These steels are furnished to these properties rather than to chemical composition limits.

These steels must also pass a bend test. Therefore, certain elements which might be added for strength—but at the expense of ductility—must be held down.

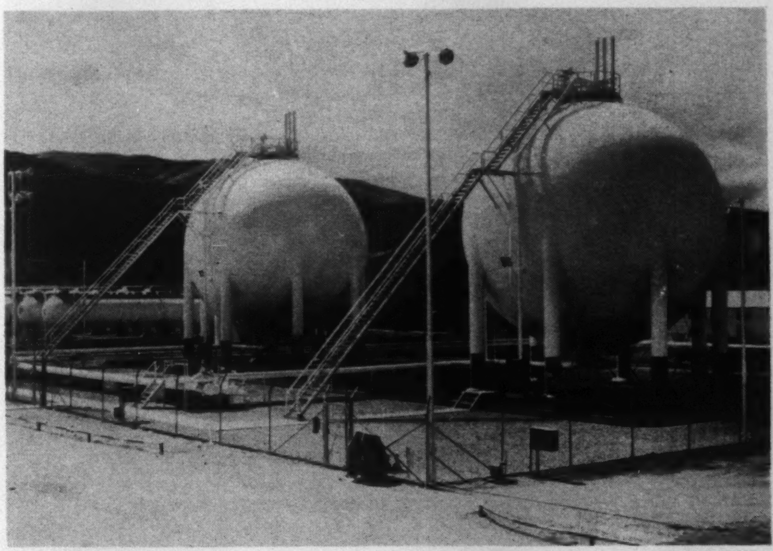
The high-strength low-alloy family, as defined by the AISI, belongs in this group. The ASTM specification A-242, for these steels, points out that they are intended for welded or riveted construction.

Limited by Chemistry — When does a steel move out of the high-strength low-alloy group family into other high-strength groups? One cutoff point is based on chemistry of ladle analysis. There are certain limits according to A-242. Carbon must be held to 0.22 pct, manganese to 1.25 pct, and sulfur to 0.05 pct.

Other steels resemble those in

Allegheny Ludlum Steel Corp.

WELDS STRIPS FOR CHAMBER: Added features of ductility and weldability electultrastrength steel, such as AM-355, to rocket chamber job.



U. S. Steel Corp.

BIGGER AND BETTER: Use of superstrength steels gives both strong and lightweight structures. Improved corrosion resistance is added factor.

the high-strength low-alloy family. But their manganese content is usually too high (greater than 1.25 pct) to be classified as such. Because of this high manganese content, their weldability suffers.

They are called high-strength structural steels. A tentative ASTM specification, A-440, points out that they are intended primarily for bolted and riveted construction as opposed to welded.

Discuss Three Groups — These two families, the high-strength low-alloy and the high-strength structural steels, will be referred to as the high-strength group. Other groups will be referred to as superstrength steels and ultrastrength steels.

These groups differ from each other by more than strength alone. The first two generally find their way into structural work and are used in the as-purchased condition.

The ultrastrength group, however, usually achieves desired strengths by further hardening.

Ready for Use — The superstrength steels are mostly proprietary alloys. Like the high-strength group, they arrive in your plant ready to be put to use. They find their way into the structural, transportation and construction fields—but for jobs which require higher strength.

Properties Hinge On Alloying

ALUMINUM:	produces fine austenite grain size, promotes nitriding
BORON:	increases hardenability
CARBON:	principle hardening element; decreases ductility and weldability
COBALT:	improves high temperature properties; aids magnetism retentivity
CHROMIUM:	improves depth hardenability; enhances corrosion and abrasion resistance; forms stable carbides; promotes carburization
COLUMBIUM:	refines grain structure, improves weldability; decreases hardenability
COPPER:	improves corrosion resistance; gives strength
LEAD:	aids machinability
MANGANESE:	increases strength and hardness; aids surface quality; decreases ductility and weldability
MOLYBDENUM:	imparts hardenability and toughness, increases high temperature properties; forms stable carbides
NICKEL:	provides deep hardening; improves low-temperature toughness; aids corrosion resistance; eases heat treatment
SILICON:	raises critical temperature for heat treatment; increases susceptibility to decarburization
SULPHUR:	aids machinability; decreases weldability and transverse ductility
TITANIUM:	improves abrasion resistance
TUNGSTEN:	improves abrasion resistance
VANADIUM:	refines grain structure; enhances mechanical properties
ZIRCONIUM:	reduces strain aging; aids high temperature properties

As expected, their chemistry reveals a greater percentage of alloying elements such as nickel, molybdenum and copper. The average yield point of a superstrength steel is about 100,000 psi.

Ultrastrength steel is the name given the last group of steels with higher strengths. These metals combine toughness and ductility with exceptional strength. A yield point of 200,000 psi, for example, is easily obtained.

Once used mainly for aircraft parts, these steels are now in demand for applications ranging from heavy machinery and equipment to gears and pulleys.

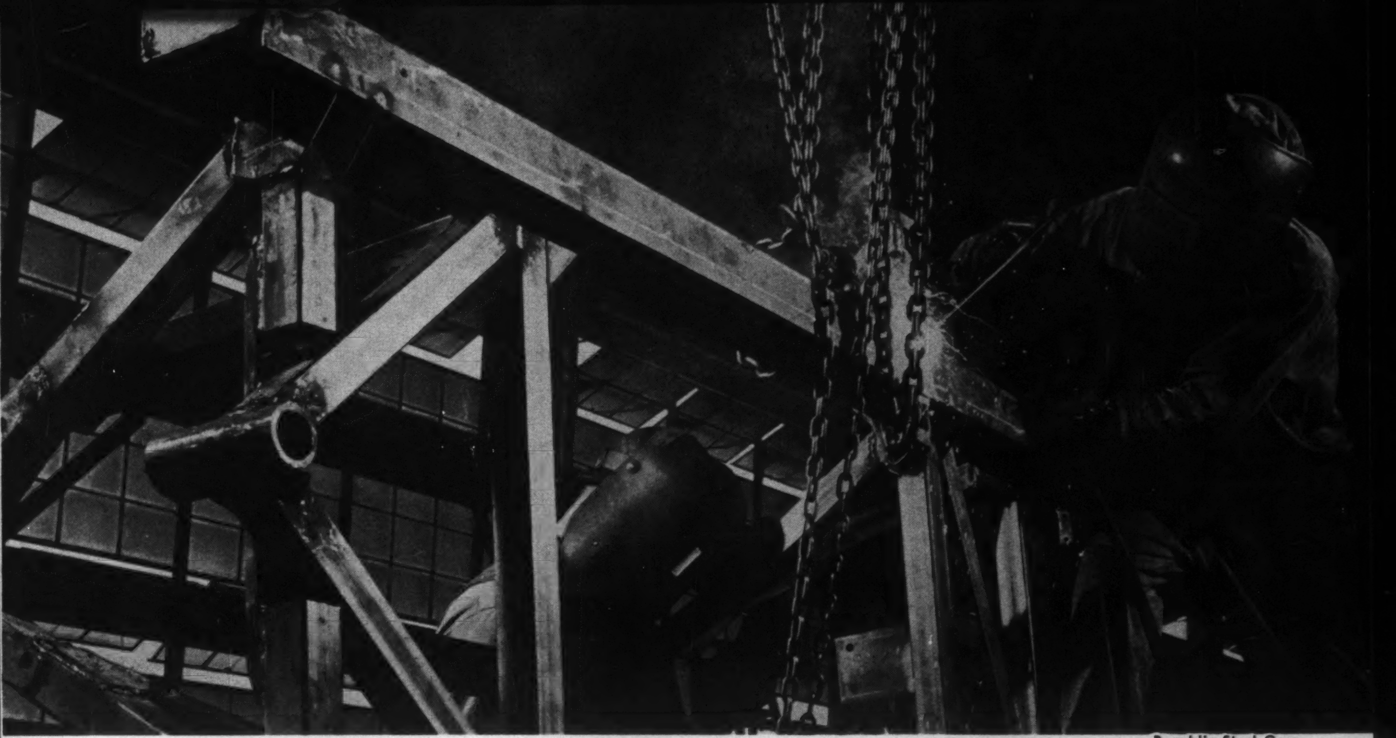
Offsets the Cost—Whether you buy high-strength, superstrength, or ultrastrength steels, you receive more than so many pounds of metal. You also get more than high strength. Other advantages more than offset their higher initial cost.

Equipment and structures, for example, last longer due to greater corrosion and abrasion resistance. The ability to design with thinner members boosts payload. The lack of forming and welding problems when working with these steels are added bonuses.

Built-In Properties — Switching to higher strength steels means that you can buy the metal with built-in strength. For many of the steels, heat treatment is not needed—thus saving on the cost of equipment.

In addition to floor space, you also save on the costs of handling, preparation, and cleaning. And because you buy steel with prescribed mechanical properties, the quality control of your products is maintained at a consistently high level.

Whatever your strength needs, there's probably a job for a higher strength steel in your plant. If you're already convinced of the merits of these metals, it'll pay to make sure you're making full use of them.



Republic Steel Corp.

NO JOINING PROBLEM: Carefully controlled chemistry of high-strength steels insures good weldability.

- How to Get More for Your High-Strength Steels Dollar | **Section 2**

Why High-Strength Steel Grades Focus on Vehicles, Structures

If you're looking for lowest cost per unit of strength or service life, try the high-strength steels.

They'll allow you to do the same job with less metal.

- High-strength steels are tonnage grades of structural steel with tailor-made properties. Developed to meet the demand for less deadweight in structures, they come ready to be used. No heat treatment is needed.

In addition to a yield strength about 50 pct greater than structural carbon steel, these steels have greatly improved corrosion resistance.

It takes only minor amounts of alloying elements to achieve these traits. Thus, the mill price of these steels is low compared to their benefits.

Serve Many Fields—This teaming up of high strength, corrosion resistance, and low cost spurs interest in these steels for many fields of industry and construction.

Consider movable equipment made with thinner sections. It features less weight and greater payload. Structures made with the same thickness of steel have longer life. A compromise in section size combines weight savings and longer life.

The choice between lightweight, standard or heavy construction must be decided on the basis of the economic factors involved. First cost is not the only criterion. Compare it with the benefits of greater payload. Weigh your repair and maintenance costs also.

Take Your Pick—Designers have a lot of leeway. High-strength steels come as-rolled, as-annealed, or as-normalized. Forms are those commonly supplied in carbon steel. These include sheet, strip, plate, structural shapes, bars, and bar-size sections.

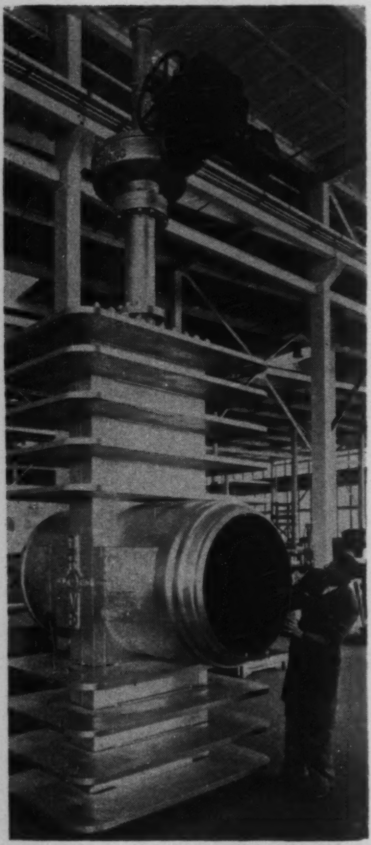
There are a number of proprietary steels from which to select. Most conform to the ASTM specifications, A-242 or A-440, covering high-strength steels.

In the hot-rolled condition, within certain thickness limits, they have these highest minimum properties specified. Yield point must

Guide to High-Strength Constructional Steels

		TYPICAL PROPERTIES					
FAMILY	FEATURES	Yield Strength, psi	Tensile Strength, psi	Elongation, pct (8 in.)	Corrosion Resistance*	Weldability	Some Representative Trade Names
High-Strength Structural Steels	Strength, Economy, Toughness	50,000	75,000	18	2x	Fair	Hi-Man, Jalten #3, Man-ten, Medium Manganese, Republic M, Yoloy M
High-Strength Low-Alloy Steels I	Strength, Toughness, Weldability	50,000	70,000	18	2x	Good	Manganese-Vanadium, Tri-ten, Tri-Steel
High-Strength Low-Alloy Steels II	Strength, Weldability, Greater Corrosion Resistance	50,000	70,000	18	4–6x	Good	Armco #1, Clay-Loy, Cor-ten, Dynalloy, Hi-Steel, Jalten #2 Kaisaloy #1, Maxeloy, Mayari R, N-A-X High Tensile, Yoloy HS

* Improved over carbon steel.



Kaiser Steel Corp.

GIVES RIGID SUPPORT: Ribs and gate of huge valve must stand up to rigors of high pressure flow.

be 50,000 psi; tensile strength, 70,000 psi; elongation, 18 pct.

Properties Vary—But individual chemical compositions vary. So does the combination of strength, toughness, ductility, abrasion and corrosion resistance in many of the steels.

Many producers offer several versions of a basic composition. One grade may have added corrosion resistance and weldability; another may feature weldability and toughness; another may be the economy grade.

The corrosion resistance of these constructional steels ranges from two to six times better than carbon steels.

Although, some rusting occurs, the rust is finer, tighter, denser and less porous than that which forms on carbon steel.

Paint adheres better to the high-strength steels. Rust still forms at any breaks in the paint or even under it. But the rust is less voluminous; and it is less flaky. Thus, it does not rupture the paint film as readily and prolongs paint life.

Who Are Users?—The greatest demand for high-strength steels comes from makers of transportation equipment. These steels have been used in vital parts of more than 200,000 railroad freight cars. Sections can be made of thinner gages. Builders eliminate as much as 10 tons of deadweight per car.

Other large users are the mining, construction, shipbuilding, and machinery industries. High-strength steels are also filling key roles for bridge builders.

Profit in the transportation field depends upon payload. Using these steels to reduce the deadweight of a truck or freight car means that the payload is higher. One manufacturer adds 500 lb to the payload of his truck by building the platform of high-strength steel. If the vehicle is slated to carry the same load, there'll be fuel savings and less tire wear.

Takes Brutal Service—The durability of these steels answers the demands for heavy-duty equipment to run around the clock under heavy loads and speeds. The dump-beds of many new trucks are lined with high-strength plates for greater protection against impact.

Improved abrasion and corrosion resistance means that the equipment lasts longer, requires less maintenance, and is less expensive to operate. All these factors more than offset the higher initial cost of the high-strength steels.

Bridge builders find unexpected rewards while working with equally strong but lighter weight sections. Economies result from lower shipping costs, handling expenses, and erection charges. These steels also allow cleaner design.

Must Be Weldable—How about the joinability of this high-strength group? The high-strength structural steel group is usually bolted or riveted. The high-strength low-alloy group, though, is used when welding is required.

It's important for the low-alloy group of high-strength steels to be weldable. The cost of these steels means that they must offer certain welding and design advantages if they are to remain competitive.

Most of the new bridges being welded today, for example, use large percentages of high-strength low-alloy steels. They are used in the most highly stressed members. They also serve in the joints to achieve the greatest strength with the least weight and bulk.

It's the low carbon and manganese contents of most high-strength low-alloy steels that insures good weldability. The low-alloy content also restricts air hardening. Preheating is not required.

Procedures Are Standard—The same welding processes and electrodes used with carbon steels work with these steels. These include metal-arc, submerged-arc, and spot welding.

For manual arc-welding, a covered mild-steel electrode such as an AWS E6000 type is recommended. In some cases of a highly stressed notch design, you may want to use a higher tensile rod. However, proper design will eliminate this need.

Special alloy electrodes are not needed because the base metal enriches the weld deposit to make it corrosion resistant.

Adjust for Gage — What about

Youngstown Sheet & Tube Co.

BOOSTS PAYLOAD: High-strength steel permits building with thin rather than bulky sections. This means less deadweight, greater payload.

Jones & Laughlin Steel Corp.

CUTS EASILY: Practices are same with both high-strength and carbon steels. Full line of structural shapes also adds to design freedom.

How Specifications Compare

MECHANICAL PROPERTIES (¾-in. thickness)	STRUCTURAL CARBON STEEL	HIGH-STRENGTH LOW-ALLOY STEEL	HIGH-STRENGTH STRUCTURAL STEEL
ASTM Specification	A-7	A-242	A-440
Yield Point, psi	33,000	50,000	50,000
Tensile Strength, psi	60,000–72,000	70,000	70,000
Elongation, pct (8 in.)	21	18	18
Bend Test Ratio	½	1	1
CHEMICAL REQUIREMENTS (ladle analysis)			
Carbon, max, pct	—	0.22	0.28
Manganese, max, pct	—	1.25*	1.10–1.60
Sulphur, max, pct	0.05	0.05	0.05
Phosphorous, max, pct (acid openhearth)	0.06	—	0.06
Copper, min, pct	0.20**	—	0.20
Silicon, max, pct	—	—	0.30
Others		any elements to achieve desired properties	

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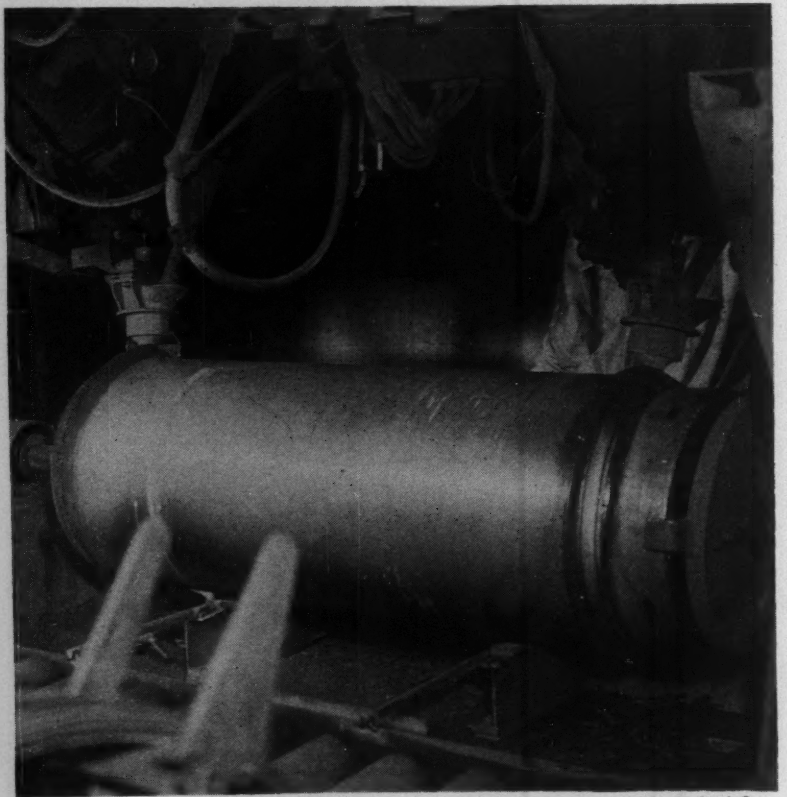
* Can be 1.40 if carbon is 0.15.

** When copper steel is specified.



Armco Steel Corp.

TO TAKE PRESSURE: Submerged-arc welding process works with high-strength steels. Strong and lightweight tank will contain bottled gas.

heavier gages, and multipass welding where dilution of the base metal may become a factor? In these cases, try an AWS E7000 type electrode. It deposits filler metal about equal in strength to the base metal.

Submerged-arc welding of high-strength low-alloy steels gives similar results as metal-arc welding. You can use the same welding wire normally used with carbon steels. Even on heavy sections up to 1½-in. thick, preheat or postheat is not needed for good weldments.

High-strength low-alloy steels can be spot welded to each other and to many carbon steels. Check surface cleanliness. Pickling or sand-blasting may be needed to prepare the metal.

Takes Spot Welding—Conditions for spot welding are about the same as for carbon steels. But the low-alloy steels have high resistivity and are more sensitive to time and current. The welding current may have to be slightly lower and the pressure slightly higher.

You can use powered-iron electrodes to weld these steels. For critical working conditions, try low-hydrogen electrodes.

In addition to the material weight savings, high-strength low-alloy steels have an edge when it comes to welding design.

Steel is not wasted for splices and lap joints. Plates can be joined edge to edge to make box and plate girders without the need for flange angles and splice plates.

How About Formability? — Industry uses a wide variety of formed sections as structural members. These are usually made from sheet, plate and strip by fabricating on brake presses, drawbenches, dies and other standard plant equipment.

Can high-strength steels be formed with this equipment? The answer is yes—even when the operation is quite severe.

Cold forming a high-strength steel differs from cold forming one of the carbon steels. Since the former is stronger, it takes more force to give an equal amount of deformation. Very often though, the high strength steels are used in thinner sections. Thus, the total forming pressure is about the same for each steel.

Allows for Springback—Another difference between the two steels is the greater allowance for springback that the high-strength low-alloy steel needs. Die clearance may have to be slightly increased. Forming calls for a more liberal radius of bend.

Not all these steels form equally well. Many producers make special forming grades. But here are some general tips for cold bending of the low alloy group that may be helpful.

It's recommended, that certain minimum inside radii be used: up to 1/16 in., a radius equal to the thickness of the material; from over 1/16-¼ in., two times the thickness; from over ¼-½ in., three times the thickness.

Check the Direction—Here are some other tips. Bends made parallel to the rolling direction are more severe than those made across the rolling direction. Therefore, try to design accordingly. Remove rough edges, burrs, and fins from areas to be cold formed. Temperatures should be above 60°F when forming.

For thicknesses over ½ in. and very severe operations, the inside radius of bend may often be reduced from those recommended for cold forming.

Suggested die temperatures may vary somewhat depending upon the producer. A temperature of about 1550°F usually gives good results. Since the mechanical properties of these steels are little affected by hot forming, no post treatment is needed.

Speed is Same—Most of the high-strength steels can be gas cut as fast as carbon steel. Speed of cutting, smoothness, and heat effect are about the same for both steels.

Machining, drilling, sawing, reaming, milling can be performed using the same practices as with carbon steel. However, the job may need a power increase. Some other hints: A reduction in speed will benefit tool life. It helps to use a coolant for most machining operations.

Shearing and punching are also possible. No excess burrs or fins result. Again, the higher strength of these steels calls for more force —about 20 pct. Also needed is more severe clamping than for carbon steels.

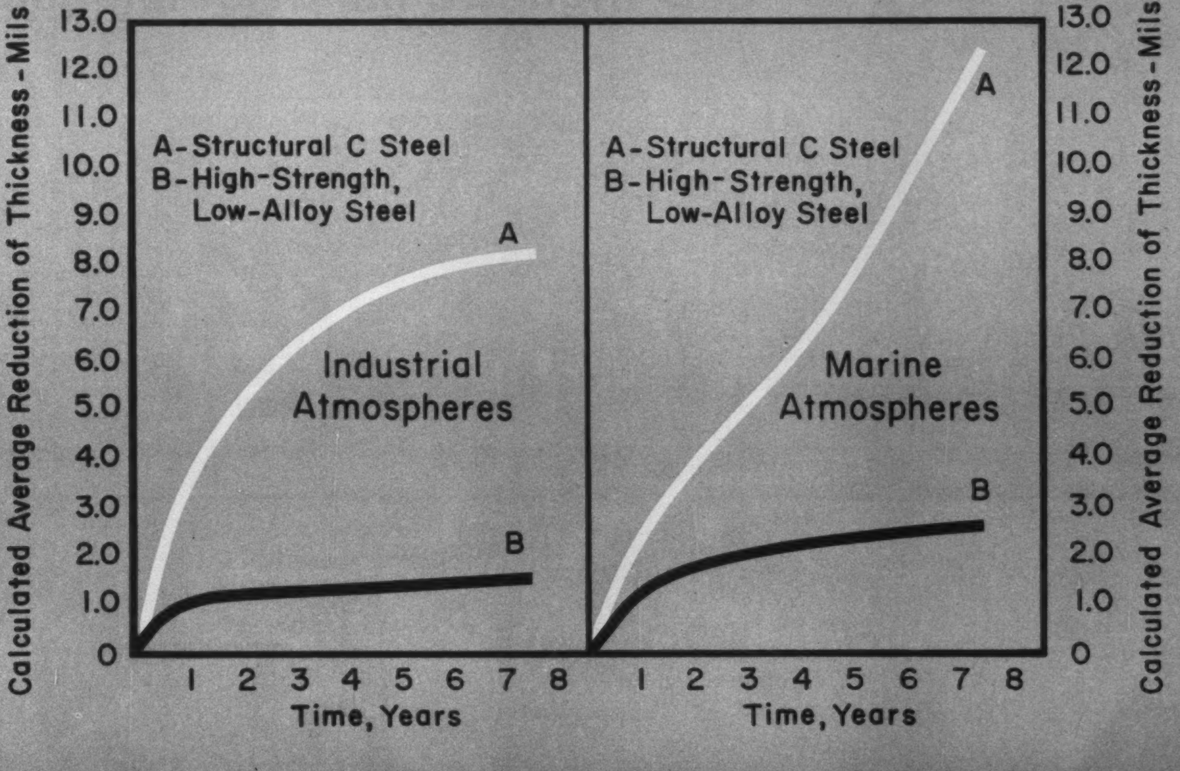
More are Switching—The ease in fabricating high-strength steels is another reason why more and more metalworkers are switching to these steels.

Consider again these advantages: minimum cost per unit of strength; minimum cost per unit of service life; minimum overall cost due to operating savings and lower maintenance expense.

Take another look at these steels. They may be the answer to your needs.

Nudges Corrosion Curve Down

U. S. Steel Corp.



Superstrength Steels Pave Way For New Design Concepts

Extra strength is the key ingredient that sets superstrength steels apart from the high-strength group.

Designers are taking advantage of it.

- Superstrength steels take over where high-strength steels leave off.

Sparking the rise in their development are certain new trends in industrial design. These include: lighter weight construction, highly-stressed equipment; less bulky sections. Costs, of course, must be kept in line.

Limits Its Use—True, the high-strength group of steels fills these roles for many branches of metalworking. But selection of steel depends upon many factors. And the lower yield point of the high-strength group is one that limits its use.

Consider the new bridge over San Francisco bay. It highlights the best features of all three types of structural steels.

Most of the steel used is economical A-7 carbon steel. It's for those areas carrying the lightest loads. High-strength low-alloy steel, A-242 type, makes up most of the remaining superstructure except for certain heavily stressed members. Those sections require a superstrength steel.

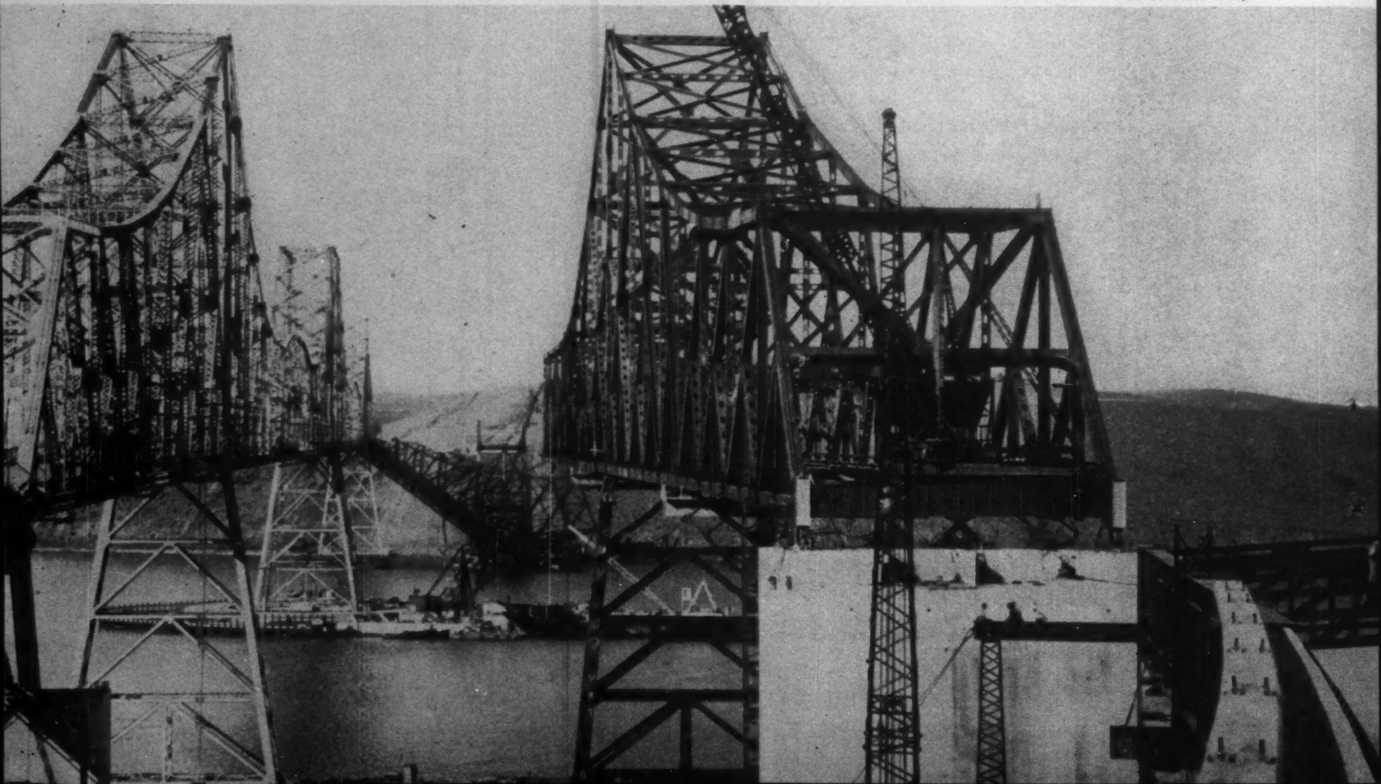
Use of the higher strength steels allowed thinner, lighter truss members that were shop welded instead of riveted. Result: a bridge which best combines strength, economy, and good design.

Sets Groups Apart — Strength, then, is the key property that sets the high strength and superstrength groups apart. But, like its predecessor, superstrength steel features good weldability and resists atmospheric corrosion.

In addition to cutting weight and costs in bridges, superstrength steels have many other jobs cut out for them. Applications run the gamut from television towers and pressure vessels to power shovels and dragline buckets. Savings mount up due to lower maintenance, freight, erec-

NEW DESIGN: Builders of new span (right) saved many tons of structurals by designing with superstrength steel. The stronger steels permitted thinner truss members. They also saved about $800,000.

U. S. Steel Corp.



tion and welding costs.

Unlike high-strength steels, the superstrength group usually arrives in your plant in the quenched and tempered condition. Selection can be made from a variety of strength levels. Most wrought forms are available.

Other Versions, Also — Most members of the superstrength group are proprietary steels. Examples are U. S. Steel's T-1, Great Lakes' N-A-XTRA grades, and Jones & Laughlin's new Jalloy S series. Versions of these grades are sold for those jobs that call for extra abrasion resistance. They're heat treated to specific Brinell hardnesses.

There's another family that may fit into the superstrength group. It comprises steels like La Salle Steel Co.'s special bars. They're made by drawing standard AISI alloy steels at a certain temperature. The technique produces heat-treated stock with built-in properties.

Strength Governs Choice—How are the superstrength steels welded? When metal-arc welding, it's best to use low-hydrogen electrodes. Choice of electrode type depends on weld strength desired. However, electrodes of the AWS E-9000 to the E-12000 classifications usually suffice. Pre-heating is not needed.

Take care, when using these electrodes, to prevent moisture pickup by the coatings. Underbead cracking may occur.

If the weldment is slated for stress relieving, electrodes of the Ni-Mo-V type should not be used. Studies show that this heat treatment injures the toughness of the weld metal.

How about submerged-arc welding? This process takes larger currents than those used with hand welding. It puts excessive heat into the base metal. Thus, use multipass welding when possible. Try to keep heat input per inch lower than that used with manual welding.

Takes More Force—Forming of superstrength steels presents no major problems. Just remember that, because of higher strength, the steel takes more force than carbon steels for forming. Allow for a more liberal bending radius. Keep in mind the greater springback.

Other bending precautions are similar to those mentioned for the high-strength steels. Bending with the axis of bend perpendicular to the rolling direction is preferred. If it can't be avoided, then specify higher quality stock when ordering.

For plates up to 2-in. thick, these minimum bending radii are advised: up to 1-in. inclusive, 2X the thickness; over 1 in. to 2 in. inclusive, 3X the thickness. In line with any good shop practice, all burrs, fins, and rough edges should be removed before bending.

Gas cutting practice is the same as with the high-strength steels. It causes a hard surface but the edge is also very tough and takes much distortion. Stress relieving is not needed to prevent cracking. If desired, though, machinists can edge soften the surface to ease machining.

Machinists should take the higher hardness and toughness of the material into account when adjusting speeds and feeds. High-speed or carbide-tipped tools are recommended.

Supersteels Plug Strength Gap

Examples*	Properties**				Nominal Analysis, pct							
	Yield Strength, psi	Tensile Strength, psi	Elongation, pct (2 in.)	Available Thicknesses, in.	C	Mn	P	S	Si	Mo	Cr	Others
N-A-XTRA 80	84,500	101,500	25.6	0.125–1.0	0.15	0.80	0.015	0.025	0.70	0.20	0.60	0.07 Zr
T-1 (over 2.5 in.)	90,000	105,000–135,000	16	2.5–6.5	0.10–0.20	0.6–1.00	0.040	0.05	0.15–0.35	0.40–0.60	0.40–0.80	0.7–1.0 Ni; 0.03–0.10 V; 0.15–0.50 Cu; 0.003–0.006 B
Jalloy-S 90	92,700	100,100	20	0.075–1.0	0.10–0.20	1.1–1.5	0.040	0.04	0.15–0.30	0.20–0.30		
N-A-XTRA 90	93,400	110,100	25.2	0.125–1.0	0.15	0.80	0.015	0.025	0.70	0.20	0.60	0.07 Zr
T-1	100,000	115,000–135,000	18	0.1875–2.5	0.10–0.20	0.6–1.00	0.040	0.05	0.15–0.35	0.40–0.60	0.40–0.80	0.7–1.0 Ni; 0.03–0.10 V; 0.15–0.50 Cu; 0.003–0.006 B
N-A-XTRA 100	102,000	118,600	25.1	0.125–1.0	0.15	0.80	0.015	0.025	0.70	0.20	0.60	0.07 Zr
Jalloy-S-100	107,000	115,000	18.5	0.075–1.0	0.10–0.20	1.1–1.5	0.040	0.04	0.15–0.30	0.20–0.30		
Jalloy-S-110	114,400	122,000	17	0.075–1.0	0.10–0.20	1.1–1.5	0.040	0.04	0.15–0.30	0.20–0.30		
N-A-XTRA 110	115,000	131,000	21.2	0.125–1.0	0.15	0.80	0.015	0.025	0.70	0.20	0.60	0.07 Zr

* This is just a representative list.

** Superstrength steels also feature good weldability and formability. Their resistance to atmospheric corrosion is about four times better than carbon steel.

Allegheny-Ludlum Steel Corp.

PASSES TEST: It takes an ultrastrength metal to meet the criteria for airliner's de-icing system.

- How to Get More for Your High-Strength Steels Dollar | **Section 4**

Ultrastrength Steels Move Into Vital Industrial Jobs

"Ultrastrength steels" usually bring to mind only space age applications. But these metals are also being used for more everyday jobs.

Can they be the materials you've been looking for?

- Behind the rapid growth of ultrastrength steels is the challenge of the space age. Yet, the aircraft and missile industries aren't the only ones profiting from their development.

The same steel used for landing-gear parts fills the bill for power shafting, lathe parts, or hoist chains. Steel for high-strength aircraft-bolts solves many problems for makers of heavily stressed equipment. Special alloys for wing fasteners now serve in lightweight gears and axles.

Take On Other Jobs—Jet and rocket engines subject materials to extreme heat and corrosive attack. Metals lose their strength or erode until parts fail. Steels developed to combat these problems are now extending the life of many types of non-military equipment.

What about cost? Yes, these steels are more costly than the high-strength or the superstrength steels. But there are many instances in which they are the logical material choices.

This is why. Either no other material can do the job; or the savings from lighter weight and less space—due to ultrastrength—offsets the extra cost.

Fit Into Classes—Let's take a look at these ultrastrength steels. Most of them fall into one of these classes. They are: hot-work die steels, martensitic stainless steels,

Can You Use Ultrastrength Steels?

	MECHANICAL PROPERTIES*					
GROUP	Yield Strength, psi	Tensile Strength, psi	Elongation, pct	FEATURES	SOME APPLICATIONS	EXAMPLES**
Hot-Work Die Steels	190,000–255,000	230,000–310,000	5–13	High temperature properties, wide ductility range, good fabricability, air hardenable	Landing gear parts, missile structures, high-speeds rotors and shafts, forging dies, tools	Dynaflex, Hy-Tuf, Potomac A, Pyromet 882, Unimach I, Vascojet 1000
Martensitic Stainless Steels	180,000–220,000	210,000–245,000	10–16	Good creep rupture properties, resistance to crack propagation, resistance to atmospheric corrosion	Engine parts, missile power plant tanks, rotors, steam turbine blades	Type 418, Type 422, 12 Mo V
Low-Alloy Martensitic Steels	190,000–230,000	220,000–290,000	8–12	Economy, high-temperature properties	Landing gears, bolts, oil-well machinery	AISI 4340, AMS 6434, 17-22 AS, X200, 300 M
Precipitation-Hardening Semi-Austenitic Stainless Steels	160,000–240,000	200,000–250,000	6–13	Corrosion resistance, ease of fabrication	Aircraft and missile bodies, boat parts, antennas, disposer parts	AM-350, 17-7 PH, PH 15-7 Mo, 17-4 Mo, Stainless W
Precipitation-Hardening Austenitic Stainless Steels	90,000–125,000	145,000–175,000	12–21	Ductility, creep resistance, ease of fabrication, corrosion resistance	Turbine wheels and blades, afterburner parts	A-286, HNM
Cold-Rolled Austenitic Stainless Steels	200,000–225,000	220,000–250,000	4–10	Weldability, corrosion resistance	Aircraft parts, appliances, railway cars	Type 201, Type 301

* These are room temperature properties taken of heat-treated stock. Note: These approximate values are meant to serve only as indicators. Variations will occur due to different heat-treatments, types of wrought form, etc.

** Representative steels were selected at random. Many other steels could have been listed.

low-alloy martensitic steels, precipitation-hardening steels, and austenitic stainless steels.

It may be surprising to some to see hot-work die steels in the ultrastrength ranks. Until recently, they were not thought of as structural steels.

Still, hot-work die steels have certain advantages that can't be overlooked. They resist softening at high temperatures. Between 400°-1000°F, they have probably the highest strength to weight ratio of any commercial structural material. They are air hardenable.

It's well known how these steels serve the tool and die industries. How do they serve the space age? Missile bodies and aircraft gear parts are just two examples.

Strengths Compare—Martensitic stainless steels are the well-known Type 400 series. After heat treatment, they almost match the strength of the die steels. Their corrosion resistance, though, is better.

Low-alloy martensitic steels like AISI 4340 are the old standbys of the aircraft industry. They're very popular when it comes to a combination of high strength and low cost. Uses for 4340 range from high-strength aircraft bolts to oil well machinery.

Several new alloys of this group are now appearing on the market. One called 300M is used both for landing gears and thin-walled pressure vessels.

The precipitation-hardening stainless steels, such as 17-7 PH and AM-350 are known as the workhorses of the space industries. Why? They combine relatively high strength, good corrosion resistance, and ease of fabrication. Also, several of these steels, such as A-286 and others, retain their high strength at temperatures up to 1300°F.

Not to be overlooked are the ordinary austenitic stainless steels, the Type 300 series, which have been cold-worked. They're in demand for jobs ranging from missile skins to railway cars and truck trailers.

Studies Other Aspects — What about availability and fabricability? A manufacturer concerns himself with these criteria also before switching to newer metals.

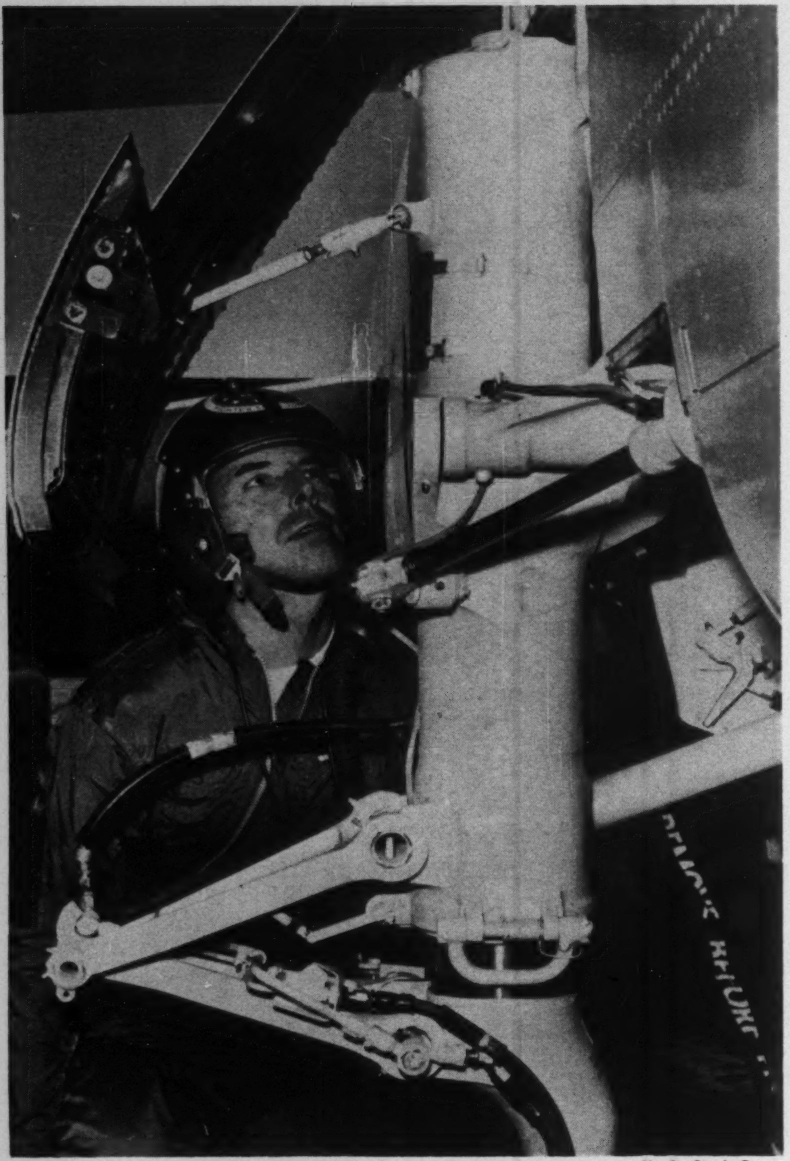
Availability presents no problem. Ultrastrength steels can be bought in most wrought forms. Fabricability, though, takes some pre-planning.

Designers must take care to cut down on stress raisers. As with most steels, parts should be designed without sudden changes in section thickness. Sometimes, a greater fillet radius is needed than for lower-strength steels.

Takes More Force — Tips for forming these steels are similar to those for the other high-strength steels. They take more force for forming. Take their higher strength into account when bending.

Welding is one of the first methods of joining that is considered when dealing with steel. Do the ultrastrength steels require any special equipment or procedures? The answer is no.

Welding of the hot-work die



U. S. Steel Corp.

TAKES IMPACT: Key parts of landing gear are of ultrastrength steel. Gear is light—yet still tough enough to take landing impact.

steels generally follows two paths. One is the inert-gas tungsten-arc process for the thinner gages. Filler rod of the same composition as the base metal should be used whenever possible. Covered electrodes are used for the thicker sections.

Weld While Soft—Usual practice calls for welding these steels in the softened state. Preheat and postheat are advised. After the weld is stress relieved, the hardening treatment takes place.

Welding procedures for the martensitic stainless steels are similar to those used for the hot-work die steels. Preheat, though, is not always needed. It depends upon section size and amount of joint restraint. But, to prevent cracking of the weld joint, postheat is essential.

Metalworkers weld the low-alloy martensitic steels by the inert-gas shielded, flash, and gas-pressure techniques. The first is preferred using either consumable or tungsten electrodes. Operators reduce weld cracking by using both preheat and postheat.

Eliminates Steps — Preheat and postheat are not needed when welding the precipitation-hardening steels. They can be easily welded using inert-gas shielded methods and filler wire similar to the base metal. Covered electrodes can also be used for all these steels except 17-7 PH or PH 15-7 Mo.

The austenitic stainless steels of the 300 series, can be welded by all fusion and resistance methods. The exception is Type 303. It should be welded by the metal-arc process with lime-coated electrodes. It's advised that electrodes and filler rods be of slightly higher alloy content than the base metal.

Most of the ultrastrength steels achieve their properties by heat treatment. Details differ for each steel. But one point to remember is the care to be given the parts during treatment.

Proper practice calls for jigging to prevent warpage or distortion. Why? It's hard to flatten ultrastrength steels. Also, harmful residual stresses may result.

Machining Is Standard—Arrange for as much machining as possible to be done before hardening. Ultrastrength steels can be machined in the annealed condition with the same practice used for other annealed alloy steels.

If machining is required after heat treatment, confine it to finishing operations. Otherwise it can be costly and time consuming. Carbide tipped tools are recommended. Grinding should be avoided.

As with many steels, cleaning or plating requires precautions to prevent hydrogen embrittlement. This embrittlement reduces ductility. It also cuts down the load carrying capacity under critical service conditions.

Thus, it can be seen that ultra strength steels can fit into most production lines. Manufacturers are finding that these ultrastrengths are giving handsome rewards.

Sound Purchase Spells Profit

Armed with the basic facts on high-strength steels, you are ready for the big step: purchase.

Here are a few tips to help you clear this barrier.

■ Many factors must be taken into account before placing an order for a higher strength steel.

First of all, have you selected the right strength group? Are you looking for a yield strength in the order of 50,000 psi, 100,000 psi or 200,000 psi?

Families Differ—Suppose you've decided upon the high-strength group. These steels can be purchased with a yield of about 50,000 psi. But, as the table in Section 2 points out, there are several families within this group.

They differ, for example, as to their weldability, formability, and degree of improved corrosion resistance. Weigh your needs carefully before making your choice.

Similar decisions must be made when shopping for a superstrength or ultrastrength steel. The combination of mechanical properties needed, desired service life, ease of fabrication, and cost are just some of the considerations. You don't want any unnecessary features.

Watch the Extras — There are many quality and quantity extras involved when buying steel. As a cost-conscious buyer, you must strike a balance between them and your product needs.

Give special attention to such items as hot rolled versus cold rolled, type of edge and finish, gage, tolerances, degree of flatness, and quantity purchases. Let's review some of them as they apply to the high-strength low-alloy family. The more costly aspects of each item should be obvious.

Product design often influences the selection. For complex parts, cold-rolled sheets are preferred over hot-rolled because of their better forming and machining traits.

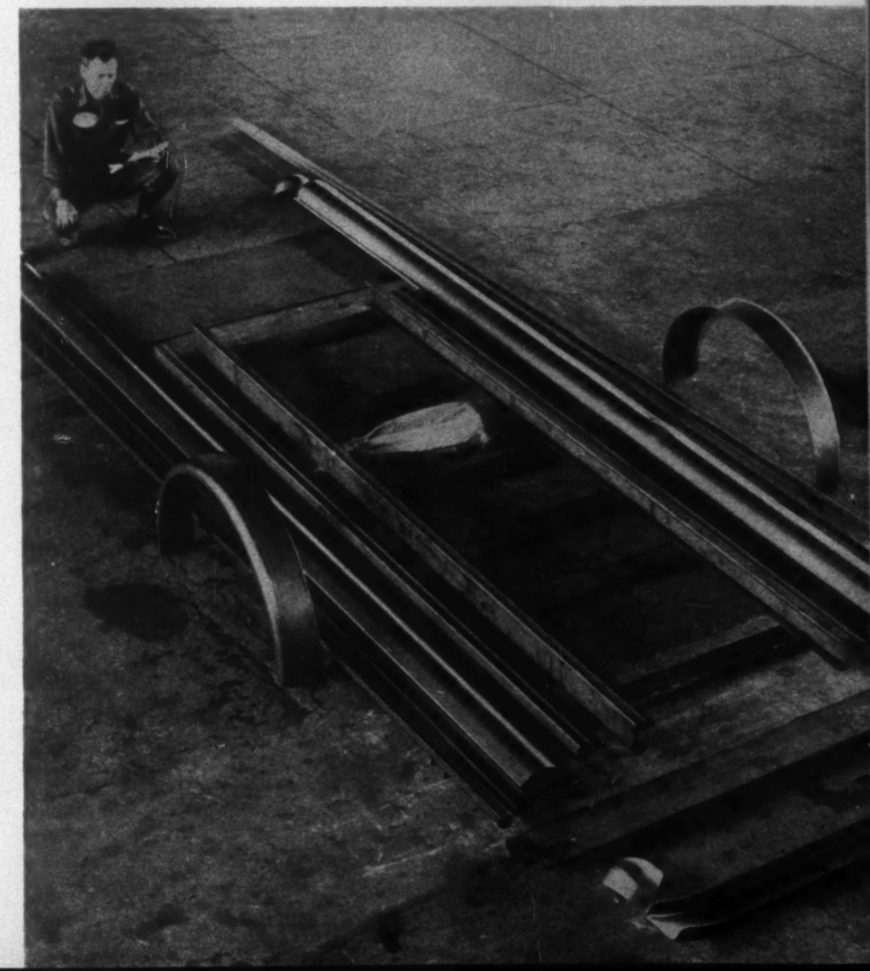
Ask for Pickling—Many fabricators object to hot-rolled sheets because of the hot mill oxides. But all they have to do it specify that the sheets be pickled. Cold-rolled stock is made by pickling after hot reduction and then followed by cold reduction and annealing.

Hot-rolled sheets can be produced with either mill or cut edges. Cold-rolled sheets have just cut edges.

Mill edge is the normal edge produced in hot-rolled sheets. It has no definite contour, and it may contain some defects such as cracked or thin edges. Cut edge is an almost square edge as a result of cutting away the mill edge with rotary knives or blade shears. Cut edges are preferred when machine welding or for feeding into machines with limited guide clearance.

Make Allowances—If the buyer

Jones & Laughlin Steel Corp.



MANY SHAPES AND SIZES: High-strength steels can be bought in a variety of shapes and sizes. Examples are tubular uprights, stringer channels and cross bars. These components are for truck body frame.

U. S. Steel Corp.

BUY WISELY: Before switching to superstrength steel for mold plate, replacements were needed every few months. New plate lasts indefinitely.

intends to shear mill-edge sheets, he should make allowances when specifying dimensions to make sure that he'll end up with the desired shape and size.

Common inspection practice is to look at just one side of the strip. If you get cold-rolled strip in cut lengths, it shouldn't have any abnormal defects on the inspected surface. Coils, on the other hand, may have some defects since the coil production process doesn't allow the producer an equal chance to spot them.

When specified, cold-rolled strip can be fabricated in such a way to cut down on surface disturbances.

Take Your Pick — What about finish? Cold-rolled high-strength low-alloy strip can be produced with either a dull finish or a regular bright finish. The former is especially suitable for lacquer or paint adhesion. The latter is suitable for many jobs. Neither one should be used for plating without grinding or polishing.

High-strength low-alloy steel plates are produced either from slabs or directly from ingots by hot rolling.

It's customary to remove some defects in plates and structural sections by grinding or chipping. Defects that don't affect the utility of the pieces are not considered injurious. Any more than customary conditioning procedures are negotiated between buyer and producer.

Structural shapes can be divided into two classes: regular and special sections. Regular sections are those which are in constant demand. Thus, they are rolled at frequent intervals and are easily obtained. Examples are: standard beams, channels and angles, H-beams, columns, joists, and stanchions.

Need Special Rolls—Special sections are those that are rolled at regular intervals and need special rolls. Examples are center sills, bulb angles, special channels, zees, and rolled tees.

It's common practice for structural shapes to be sawed, sheared, or gas-cut to length at the producer's option. When closer tolerances are required, most structurals can be cold sawed and, if need be, milled.

Hot-rolled bars are commonly cut to length by hot shearing or hot sawing. Some distortion of the ends can occur. Thus, when specified, these bars can be recut to obtain greater accuracy.

When cold cutting is specified, the bars are cut over length, specially straightened, and then recut on one or both ends to the specified length.

Acknowledgements—The editors are grateful to the many companies that have helped to make this feature possible. Special thanks go to: Allegheny Ludlum Steel Corp.; American Iron and Steel Institute; American Metal Climax, Inc.; American Society for Testing Materials; Armco Steel Corp., Battelle Memorial Institute; Bethlehem Steel Co.; Crucible Steel Co. of America; Inland Steel Co.; Jones & Laughlin Steel Corp.; Kaiser Steel Corp.; Republic Steel Corp.; U. S. Steel Corp.; Youngstown Sheet and Tube Co.

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Development of a LINDE welding process does not stop with its introduction. In the past 18 months, we have invested over 3000 laboratory manhours to further improve the UNIONARC welding process and equipment. New: portable UAM-2 machine, simplified UAW-2 torch, refined consumables. Improved equipment for an improved CO_2 steel welding process, featuring

...wear-resistant flux and wire-guide tubes, super-hard "Stellite" torch body
...automatic flux-CO_2 shutoff valve for precise flow of consumables
...stainless-steel hopper funnel for smooth flux feed
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...miniature machine—300 lbs. lighter, uses 50% less space
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...proven results: dependable operation with minimum maintenance.

For field-tested application details, see next page

UNIONARC

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One of the nation's largest construction-equipment manufacturers field-tested 15 **UNIONARC** UAM-2 machines full time—three shifts a day, six days a week—over 2000 hours per week. Maintenance has averaged less than ½ hour per machine per week, a downtime factor of less than 0.5 per cent. This is tested reliability that insures process advantages:

. . . cost as low as 27¢/lb. of metal deposited
. . . deposition rates as high as 25 lb./hour
. . . speed over 30 ipm on ¼ in. carbon-steel fillets
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On a production basis, these advantages mean substantial savings. A western pipe manufacturer saved 25¢/ft. of weld on 28,000 feet of welds. A southwestern fabricator reduced welding time on three on-site storage tanks (9500 ft. of welds) from 1850 manhours to only 700 manhours. A northern manufacturer eliminated expensive reworking of code assemblies, gained 100% weld acceptance with **UNIONARC** compared to 50% to 90% with covered electrodes. A mid-western manufacturer eliminated beveling, and reduced pass and wire requirements on Schedule 40 pipe by 2:1 and 8:1 ratios respectively.

UNIONARC welding is an ideal process for carbon steel. On a production basis, it is unquestionably faster and more economical than other CO_2 or covered electrode processes. It uses a wide range of readily-available, low-cost wires that meet any application need. It uses one flux, one low-cost CO_2 shielding gas. It has the speed and weld quality of manual submerged-arc welding, with the advantage of weld visibility. It is a sound, well-engineered process designed primarily for repetitive, high-production work on carbon steel. For these applications, the new **UNIONARC** UAM-2 machine offers outstanding cost advantages with a field-proven low-maintenance factor that produces clear-cut profit for its user. For detailed information or a live demonstration, call your nearest **LINDE** office.

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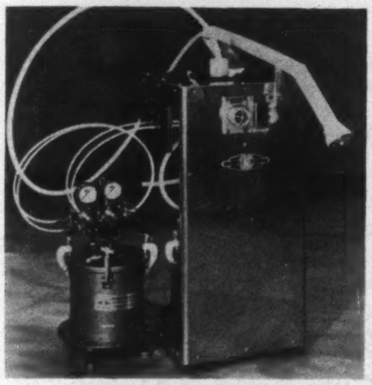
Metal Show Covers Wide Scope

Watch for these eyecatchers as you walk the aisles of the coming Metal Exposition.

This equipment, services and products can help you to improve your output and outlook for the 1961 production year.

Hand Spray Gun

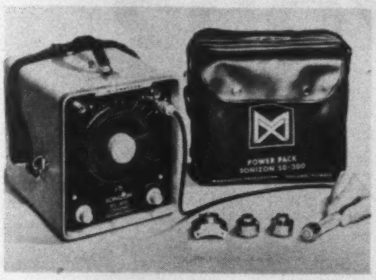
A portable hand spray gun makes possible the application of conductive, water base, and a wide range of standard paints without special formulation. The gun utilizes the principles of electrostatics to charge and guide centrifugally pre-atomized particles of coating material to the object to be coated. It permits painting of a variety of objects, indoors or outdoors, with a maximum of efficiency. (Ionic Electrostatic Corp.)



For more data circle No. 25 on postcard, p. 251

Measures Thickness

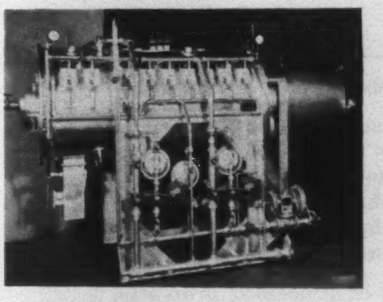
Fully transistorized, a battery-powered, direct-reading unit measures thickness from one side only, of steel, cast iron, brass, nickel, aluminum, hard plastics, and every other material which transmits ultrasonic sound. By simply placing a probe on the surface of the piece to be measured and rotating a dial, the instrument gives an instantaneous reading of thickness. On castings, core shift can be determined quickly. Improved features include a rugged chassis, greater sensitivity, and easier read-out. Accuracy is better than ±1 pct when checked against known sample. (Magnaflux Corp.)



For more data Circle No. 26 on postcard, p. 251

Heating and Quenching

Requiring a minimum of floor space, a heat-treating furnace and quenching tank insures processing uniformity. The parts are kept in motion during heating and quenching. Motion of the parts in the furnace retort insures each part receiving the same heat and exposure to the atmosphere as every other part. Motion of the parts in the rotary quenching drums provides a superior quenching action to obtain maximum uniform hardness. Motion of parts during processing is of specific advantage in carburizing and case hardening. It eliminates point of contact case variation. The furnace installation has a built-in continuous feeder. (American Gas Furnace Co.)



For more data circle No. 27 on postcard, p. 251

One Machine, Two Lives

At a major airplane manufacturing company, a dial-type universal testing machine converts into a highly-specialized research tool. A portable XY strip chart recorder makes this transformation possible. It plugs into an adapter on the side of the machine. The plug-in unit readies this or any one of several other machines for recording special cycling, time base or other tests. Mounted on a movable cabinet, this compact unit can be used when and where needed. It does not need recalibration. (Tinius Olsen Testing Machine Co.)

For more data circle No. 28 on postcard, p. 251

Bevels Steel Plate

A beveling machine cuts a bevel edge on steel plate segments prior to welding. This machine cuts faster and smoother than grinding or burning. It will cut a ½-in. bevel in mild steel. (American Pullmax Co., Inc.)

For more data circle No. 29 on postcard, p. 251

Roll-Around Cleaner

Self-contained, a roll-around ultrasonic cleaner moves easily and operates quietly. It consists of an ultrasonic generator, transducer and

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Maine Department of Economic Development

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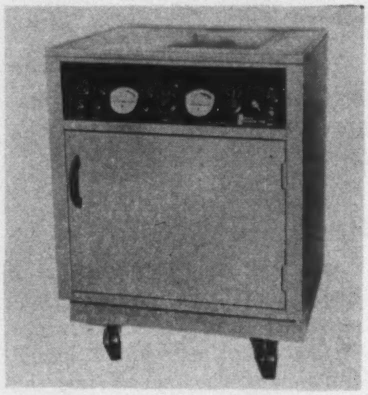
counter top. No connection to drain or plumbing is required since the cleaner is drained by means of a flexible hose connected to the unit. Tanks are positioned off-center to provide a work area on which the baskets can be placed. The roll-around cleaner plugs into a 115-v line to operate. It can be used with solvents, detergents, mild acids and alkaline cleaners. (National Ultrasonic Corp.)



For more data circle No. 30 on postcard, p. 251

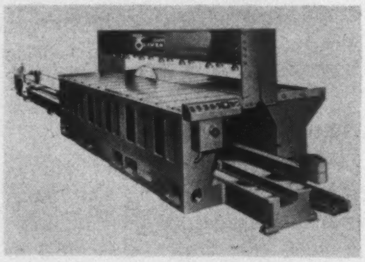
Vacuum Pumps

Compactly designed, vacuum pumps feature quiet, vibration-free operation. Compared to other vacuum pumps of the same capacity, the units save up to 50 pct in floor space. (F. J. Stokes Corp.)

For more data circle No. 31 on postcard, p. 251

Cuts Ferrous Metals

For production cutting of steel plate and other ferrous and non-ferrous metals, a heavy-duty plate saw is based on machine-tool design. The carriage, which is about 6½-ft long, rides on non-metallic ways. The ways are 5-in. wide on one side and 6-in. wide on the

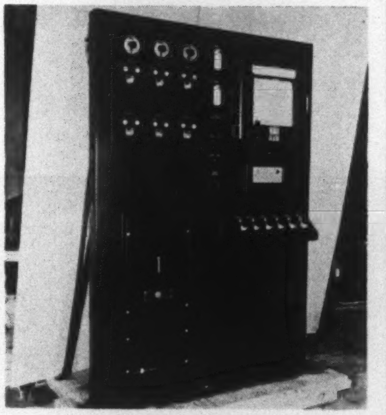


other, with a total bearing surface of over 600 sq in. Accurate feed settings can be determined by setting and marking of the rheostat control from the operator's position. The machine can cut steel plate 3-in. thick by 8 ft in length. (Oliver Machinery Co.)

For more data circle No. 32 on postcard, p. 251

Atmosphere Control

For heat treating atmospheres, an infra-red multi-control system combines measurement and control of any one of three gas compounds —CO, CO_2 or CH_4—in one system. Each system may be calibrated for any one of these three significant gas compounds. From sampling probes located anywhere in a heat treat, each system can control from two to six generators, batch furnaces or zones of continuous furnaces, or a combination of all three. (Leeds & Northrup Co.)



For more data circle No. 33 on postcard, p. 251

Optical Pyrometer

Fully automatic, a two-color optical pyrometer provides continuous measurement and control of high temperatures (1400° to 4500°F). It is designed for both plant and laboratory environments. The device measures the temperature of an incandescent object as a function of the difference between the object's radiant energy at two narrow band wavelengths within the visible spectrum. It is insensitive to unknown, varying or different emissivities. It is not affected by smoke, atmospheric contaminants, dust, dirt or

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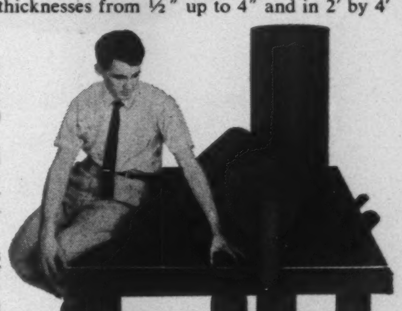

In tubular bars, the specially formulated bearing material now costs less than continuous cast bronze bushings of similar size, with prices up to 50% below other nylons.

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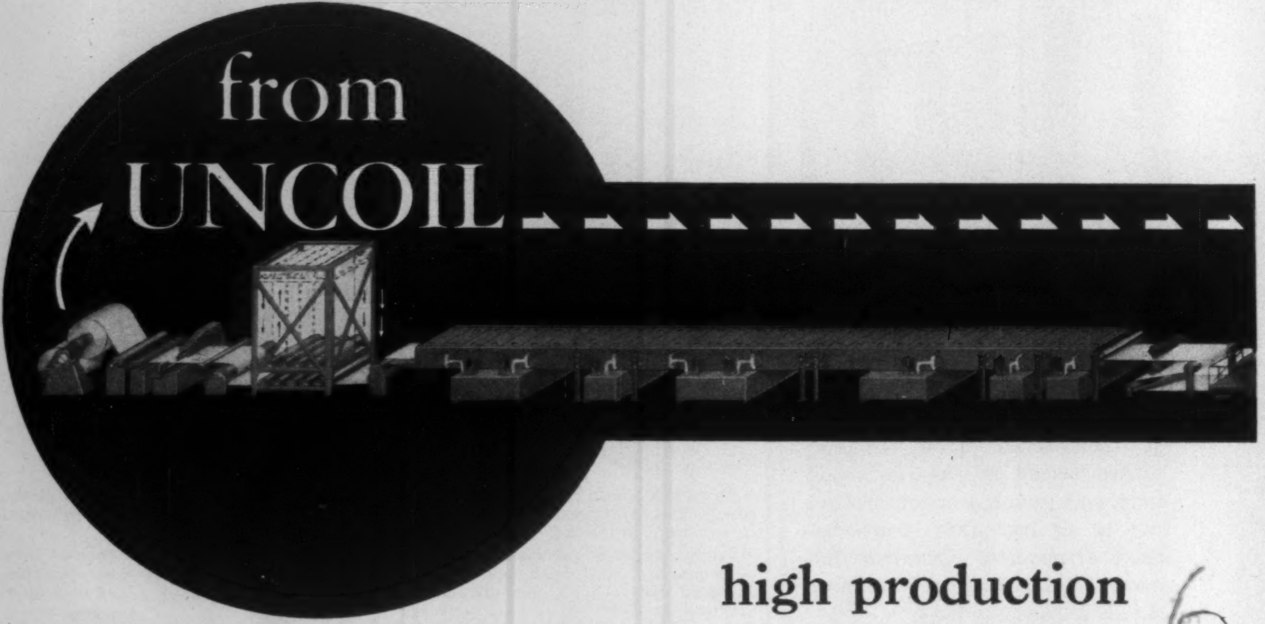
THE ROSS/WALDRON STRIP COATING LINE



high production machinery for quality coating of aluminum and steel strip

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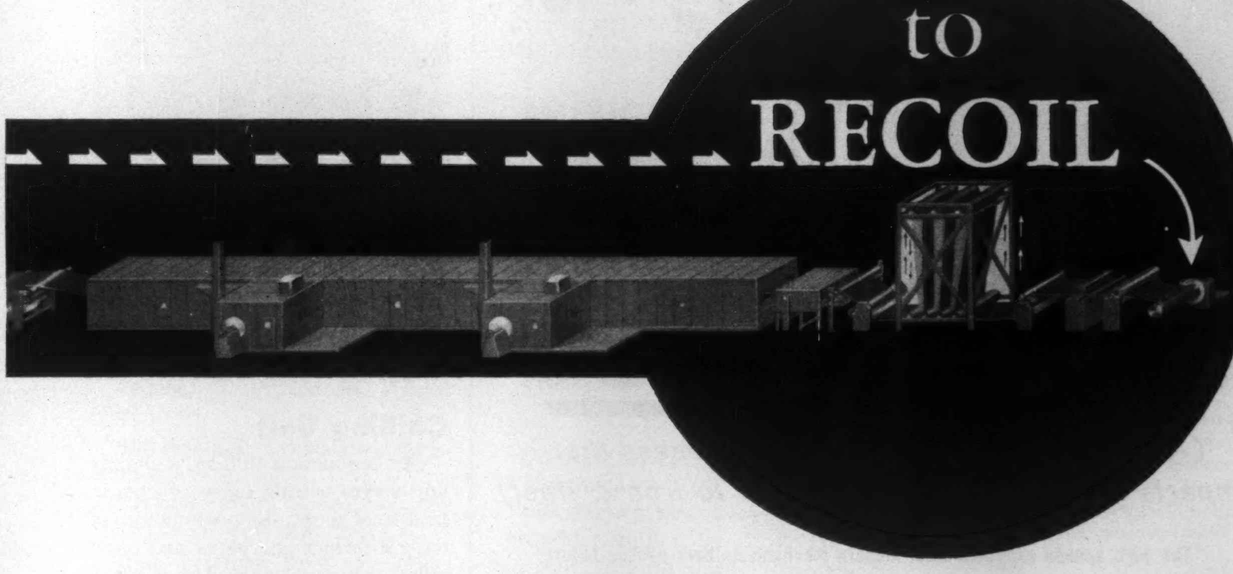

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the size of the target area. (Instrument Development Laboratories, Inc.)

For more data circle No. 34 on postcard, p. 251

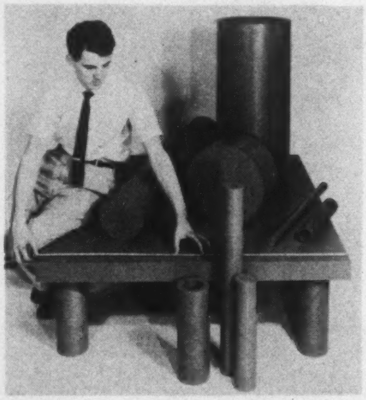
Console Furnace

Designed as a complete package, a console cold wall vacuum furnace offers many new features of special interest to small job shops and laboratories. Designed as a complete package, installation consists of simple connections to water and power. Maximum operating furnace temperature of the standard unit is 2200°F, with vacuums in the 10^{-4} mm Hg range. Maximum temperature of the furnace can be developed in a matter of a few minutes. Cooling can be effected almost as rapidly. The 10-in. diam by 20-in. deep stainless steel vacuum chamber offers a useful work area of 8-in. diam by 14-in. deep. (C. I. Hayes, Inc.)

For more data circle No. 35 on postcard, p. 251

Industrial Plastics

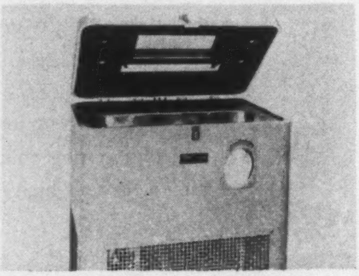
To be shown at the exposition, is an entire line of industrial plastics in mill shapes. Metal parts plastic coated in a new coating system will be featured. In this system, the metal part to be coated is preheated and dipped into a bed of dry fluidized plastic powders. The powders heat fuse to form a continuous coating. Product advantages of the solventless system include uniformity of heavy coatings applied in a single dip. (The Polymer Corp.)



For more data circle No. 36 on postcard, p. 251

Chilling Unit

For production chilling, a chilling unit serves a wide range of uses in heat-treat shops, the manufacture of tools, bearings and gages and other alloy-steel parts; as well as normalizing aluminum and magnesium castings. Chamber size is 30 x 18 x 16 in. Temperatures are available to as low as —180°F. This model gives reliable economic operation. (Cincinnati Sub-Zero Products)



For more data circle No. 37 on postcard, p. 251

When RPM's get into five figures-

consider Lubri-Case

(-the sulphur case lubrication process that imparts superior bearing qualities to iron & steel)

The high speeds expected from modern mechanisms have caused failure in many non-ferrous components. To take the strain, and to maintain the clearances necessary for adequate lubrication the use of all ferrous parts becomes necessary.

On such parts Lubri-Case, a sulphur case treatment, produces a case high in sulphur on most ferrous materials imparting load bearing, long wearing, lubricating properties even in castable and machineable low cost iron and steel. Lubri-case has been use tested in many applications under high speeds, heavy loads, elevated temperatures and close tolerances.

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Metal Show Program

AMERICAN SOCIETY FOR METALS— SYMPOSIUM FOR STEEL USERS

All meetings held in Philadelphia Trade and Convention Center.

STAINLESS STEELS

Tues., Oct. 18—2:00 p.m.

What is Stainless Steel, by J. J. B. Rutherford, The Babcock & Wilcox Co.

What to Expect of Stainless, by K. A. Matticks, Crucible Steel Co. of America.

Special Stainless Steels, by A. J. Lena, Allegheny Ludlum Steel Corp.

PANEL ON STAINLESS STEEL FABRICATION

Moderator: R. B. Gunia, United States Steel Corp.

Joining: G. E. Linnert, Armco Steel Corp.

Machining: P. Leckie-Ewing, Latrobe Steel Co.

Forming: W. L. Keene, Superior Steel Div., Copperweld Steel Co.

Heat Treating: B. T. Lanphier, The Carpenter Steel Co.

Cleaning and Finishing: S. P. Odar, Enduro Metallurgical Laboratory, Republic Steel Corp.

Wed., Oct. 19—2:00 p.m.

TOOL STEELS

Problems in Machining Space Age Metals, by M. C. Metzger and L. A. Hauser, Universal Cyclops Steel Corp.

Recent Developments in Low-Temperature Air-Hardening Tool Steels, by N. J. Kulp, The Carpenter Steel Co.

Overcoming Distortion and Cracking in Heat Treating Tool Steels, by R. Harvey, Braeburn Alloy Steel Corp.

Thurs., Oct. 20—2:00 p.m.

JOINING HIGH STRENGTH STEELS

Eliminates Hot Cracking in Welding of SAE 4340 Steels, by R. E. Monroe, Battelle Memorial Institute.

Welding T-1 Steels, By L. Keay, Lukens Steel Co.

Welding Heat Treated, Low Alloy, High Strength Steels, by C. Altenburger, Great Lakes Steel Div., National Steel Corp.

AMERICAN SOCIETY FOR METALS

All meetings held in Bellevue-Stratford Hotel.

Pre-Show Seminar

Sat., Oct. 15—9:00 a.m.

STRENGTHENING MECHANISMS IN SOLIDS

Co-Chairman: J. J. Harwood and E. Epremian.

Introductory Review of Strengthening Mechanisms, by W. R. Hibbard, Jr., General Electric Research Laboratory.

Solid-Solution Strengthening, by P. A. Flinn, Westinghouse Research Laboratory.

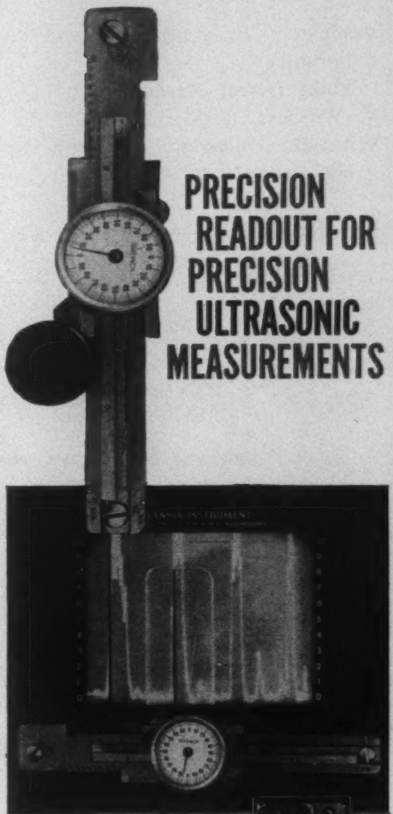
Strengthening by Work-Hardening, by J. Washburn, University of California.

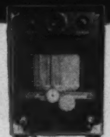
Sat., Oct. 15—2:00 p.m.

Co-chairmen: M. Fine and T. H. Blewitt.

Strengthening Mechanisms as Observed Directly by Electron Transmission Microscopy, J. Nutting, University of Cambridge, England.

Radiation Hardening, by G. H.





The *Sonoray*® Caliper permits direct readings of flaw-depth and workpiece-thickness with absolute accuracies of a few thousandths of an inch, the relative accuracy increasing with thickness. Thus the ultrasonic-pulse *Sonoray*®, pre-eminent for flaw detection, can now be used additionally for high-precision measurement of thickness.

Sonoray's extreme horizontal linearity gives 1:1 correlation between distance and CRT indication. Calibration is quick and easy. The Caliper's hairline accuracy gives direct, positive, repeatable readings on a scale calibrated in 0.001 inch.

If *you* want to profit by extended use of your *Sonoray*®, write for Bulletin *T-208* on the Caliper. If you do not yet own a *Sonoray*®, ask also for Bulletin *T-200* on this remarkable instrument. For specific suggestions, outline your problem.

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Vineyard, Brookhaven National Laboratory.

Point Defect Hardening, by D. K. Wilsdorf, R. Maddin, D. G. F. Wilsdorf, University of Pennsylvania.

Sunday, Oct. 16—9:00 a.m.

Co-chairmen: A. Guy and M. Nicholson.

Strengthening by Martensitic Transformations, by V. F. Zackay, Ford Scientific Laboratory.

Strengthening by Precipitation Reactions, by W. D. Robertson, Yale University.

Fine Particle Strengthening, by R. W. Guard, General Electric Research Laboratory.

Sunday, Oct. 16—2:00 p.m.

Co-chairmen: W. A. Backofen and W. Rostoker.

Hardening Effects Produced with Shock Waves, by G. E. Dieter, E. I. duPont Engineering Research Laboratory.

Strengthening Mechanisms in Ionic and Inorganic Solids, by T. L. Johnson, C. Li and R. Stokes, Minneapolis-Honeywell Research Center.

Role of Surface Effects in Strengthening Mechanisms, by E. Machlin, Columbia University.

AMERICAN SOCIETY FOR METALS ASM-AEC CONFERENCE

All meetings held in Bellevue-Stratford Hotel.

NON-OXIDE COMPOUNDS FOR NUCLEAR FUELS

Mon., Oct. 17—9:00 a.m.

URANIUM COMPOUND FUELS

Chairman: F. Rough, Reactor Metallurgy Div., Battelle Memorial Institute.

Introduction: J. Simmons, U. S. Atomic Energy Commission.

Refractory Fuel Compounds, by R. F. Dickerson, Battelle Memorial Institute.

Preparation and Properties Of Beryllides Containing Uranium, Speaker to be announced.

Fabrication and Properties of Uranium Mononitride, by D. Keller, Battelle Memorial Institute.

Development of Graphite-Matrix Fuels, by M. Janes, National Carbon Co.

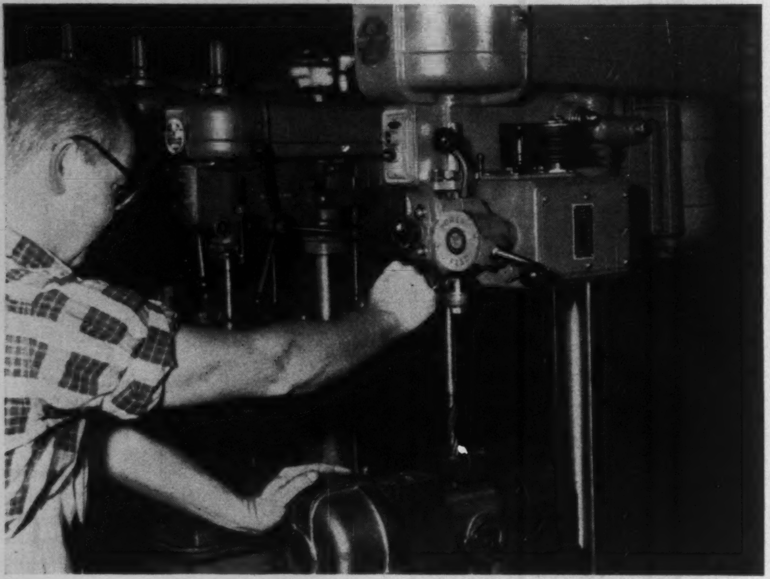
Mon., Oct. 17—2:00 p.m.

DEVELOPMENT OF URANIUM CARBIDE

Chairman: J. Simmons, U. S. Atomic Energy Commission and H. Pearlman, Atomics International.

Powder Metallurgy Fabrication of High-Density Bulk Uranium

WALKER-TURNER 20" 'POWER FEED' Drill Presses



New idea for heavy duty drilling

Here is the most advanced step in drill press power feed development to date—available in 16 models of the new W-T "Light-Heavyweight" 20" 'Power Feed' Drill Press line. Ideal for continuous, heavy duty production drilling, these machines can boost output and reduce operator fatigue, yet maintain close tolerances on repetitive operations.

A unique front-mounted pilot wheel is mechanically integrated with the clutch control to provide effortless, one-hand operation *never before available* on a standard drill press. Your Walker-Turner Distributor (listed under "TOOLS" or "MACHINE TOOLS" in the Yellow Pages) will gladly demonstrate many other outstanding features that can save you money. So see the new W-T 20" 'Power Feed' Drill Presses *in action* soon! Complete line of money-saving accessories also available.

FREE BROCHURE—Complete specifications on the new 20" floor, bench, overhead and multiple-spindle models, write: Rockwell Manufacturing Company, Walker-Turner Division, Dept. WK-28, 400 N. Lexington Ave., Pittsburgh 8, Pa. In Canada: Rockwell Manufacturing Company of Canada, Ltd., Guelph, Ontario.

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STEEL
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When production calls for economical flat, cold rolling, specify Marathon forged alloy steel rolls. When production demands quality specify Marathon steel rolls . . . induction hardened with exceptional hardening depth . . . uniform hardness . . . internally sound . . . economical . . . available with all finishes. Ask for our Technical Bulletin SR 11. Further information and details gladly furnished on request.

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SPECIALTY STEELS, INCORPORATED

A Division of Deutsche Edelstahlwerke A. G., Krefeld, West Germany DEW 375 Park Avenue, New York 22, N. Y.

Carbide, by H. Kalish, Olin Mathieson Chemical Corp.

Production of Uranium Carbide, by H. Pearlman, Atomics International.

Skull-Melting and Multiple Molding of Uranium Carbide, by E. Foster, Battelle Memorial Institute.

Compatibility of Carbides with Cladding and Coolants, by D. I. Sinizer, Atomics International.

Preparation of Zirconium-Uranium Carbide and High Temperature Properties, by M. G. Bowman, Low Alamos Scientific Laboratory.

AMERICAN SOCIETY FOR METALS—METALS ENGINEERING PROGRAM COMMITTEE

All meetings held in Bellevue-Stratford Hotel.

Mon., Oct. 17—9:00 a.m.

MATERIALS FOR THE AEROSPACE AGE

Chairman: R. J. Runck, Battelle Memorial Institute.

Properties of Materials for Aerospace Environments, by Dr. E. Scala, Avco Research and Advanced Development Div.

New Fabrication Techniques for Aerospace Systems, by Col. W. H. Grierson, Wright - Patterson Air Force Base.

Selection of Materials for Some Aerospace Systems, by H. B. Probst, NASA, Lewis Flight Propulsion Laboratory.

Mon., Oct. 17—2:00 p.m.

All meetings held in Bellevue-Stratford Hotel.

METAL JOINING

Chairmen: D. H. Buerkel, A. O. Smith Corp. and D. Howard, American Car & Foundry, Inc.

The Metallurgy of Heat Affected Weld Zones in HY - 80 High Strength Steel, by G. N. Emmanuel, D. E. Young and G. L. Spahr, The Babcock & Wilcox Co.

Evaluation of Service Difficulties Involving Material Failure, by Mrs. J. B. Barriage, Federal Aviation Agency.

Analytical Procedures Used in Evaluating High Temperature Failures, by W. R. Foley, The Babcock & Wilcox Co.

Welding of High Tensile Steels for Heavy Industrial Equipment, by R. Myer, Harnishfeger Corp.

Exothermic Brazing, by R. A. Long, Narmco Industries, Inc.

Tues., Oct. 18—9:00 a.m.

All meetings held in Bellevue-Stratford Hotel.

FAILURE ANALYSIS—I

Chairman: R. D. Wylie, The Babcock & Wilcox Co.

HAYWARD ELECTRIC MOTOR BUCKETS

Work Longer, Work Faster, Wear Less!

Hook onto any electric over-head crane . . . need no latches, hand lines, ropes or limit switches . . . can't discharge accidentally while being traversed . . . operates without need of circuit breakers . . . motor enclosed against dust, soot and weather . . . steel and bronze construction . . . can operate in pits or high-sided cars . . . *plus many other cost-cutting design features!*

Write for illustrated bulletin giving complete details including sizes, weights and dimensions.

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C ELECTRIC FURNACE STEEL CASTINGS

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"C" steel castings are CLEAN steel castings of uniform structure that will minimize machining and assembly costs, permit of greater freedom and efficiency of design and add to your product the recognized strength, endurance and desirability of steel. C steel castings, foundry engineered from pattern to finished casting can be had in

CARBON, ALLOY OR STAINLESS STEEL SAND OR SHELL MOULDED

The technical experience and knowledge of our engineering staff are at your service. Write, phone, or call.

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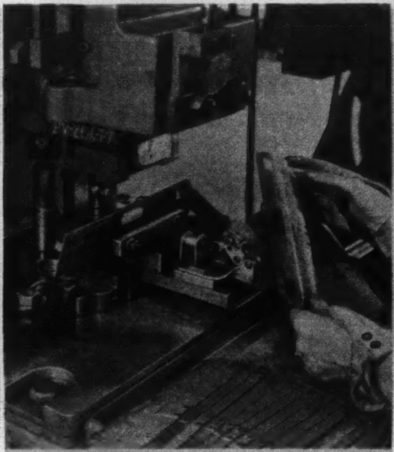
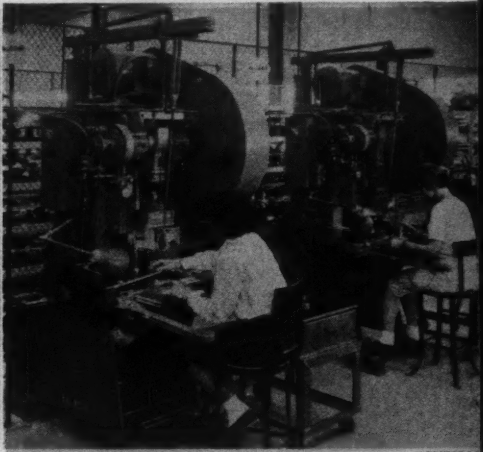
39 OBI'S GIVE PRESS DOLLARS 3-WAY STRETCH

Newly installed Niagara Inclinables provide required precision at lower investment, produce more parts per hour, and cut maintenance to the bone

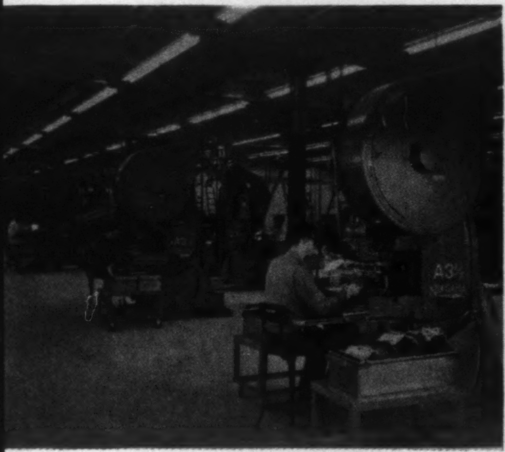
SERVING ONE OF THE WORLD'S LARGEST typewriter manufacturers in a brand-new plant, 39 new Niagara Series A Open Back Inclinables play a key role in the production of nearly 2000 precision parts for portable machines. With selection based on past experience, these presses are more than living up to expectations . . . performance-wise and dollar-wise.



.001" TOLERANCES ARE MAINTAINED as Niagara OBI's engage in a wide variety of piercing, notching, trimming, bending and intricate forming operations. Here, a hinge tab is given a final bend on a 22-ton Niagara Series A. Rigid press frames and short-coupled, multiple "V" gibs not only insure precise production, but lengthen die life.



BOOSTING PRODUCTION 30%, these fast-acting hand fed OBI's turn out an average of 1300 pieces an hour per machine. The reason: Instant clutch engagement and disengagement at every press stroke provide more working strokes per minute. Niagara's famed multi-point mechanical sleeve clutch picks up the load on 14 engaging jaws and applies driving force concentrically without keys or pins.



EVERYTHING HUMS ALONG SMOOTHLY day after day. Niagara OBI's are unmatched for dependability and safety. With fewer parts and simpler construction, there's less to go wrong . . . less to repair and replace. No complicated electrical circuits, limit switches or solenoids . . . no palm buttons, air valves or rotary connections.

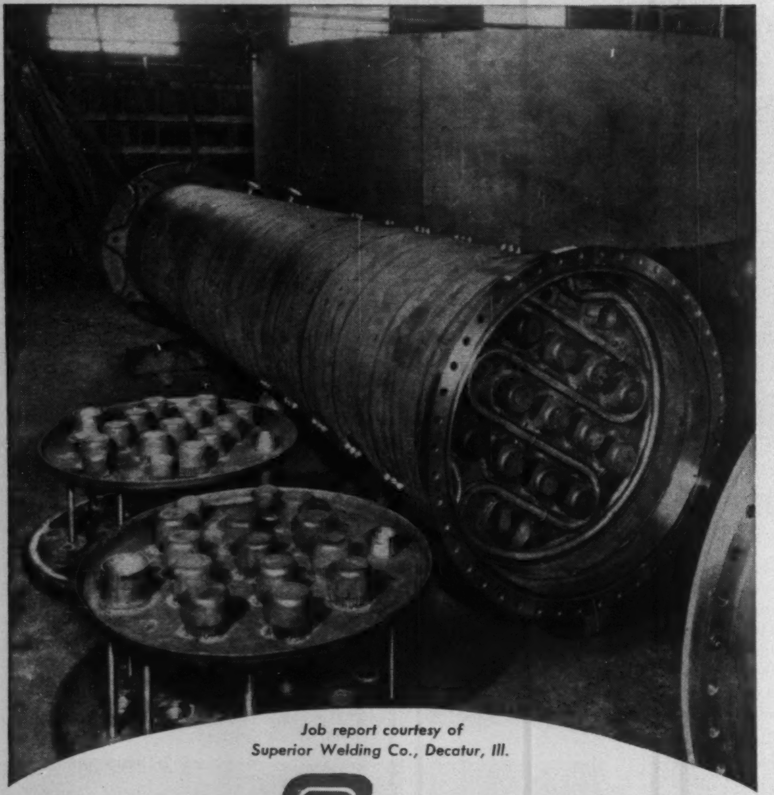
MAINTENANCE IS SHAVED TO AN "ABSOLUTE MINIMUM" according to this Niagara user. Unlike other presses previously utilized, these Series A's do not require constant "doctoring." There's no need for frequent adjustment of the clutch sleeve and brake. No "dogs" to break off and require replacement. No press can match its economy.

WANT TO STRETCH YOUR PRESS DOLLARS, TOO? Write for illustrated Bulletin 58 containing the facts and figures on Niagara Series A Open Back Inclinable Presses (built in 13 standard sizes with shaft diameters from 1¼" to 6½" and capacities from 5½ to 190 tons). *Niagara Machine & Tool Works, Buffalo 11, N. Y., District Offices and Distributors Everywhere.*

NIAGARA OBI PRESSES

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work.

When corrosion is a threat to the life of Stainless Welds

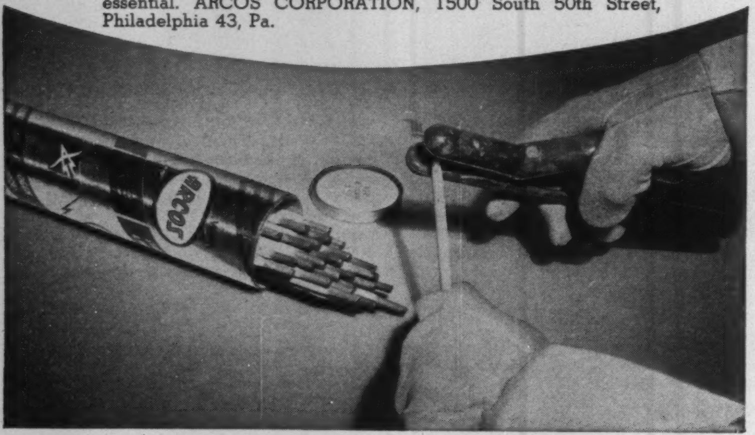


Job report courtesy of
Superior Welding Co., Decatur, Ill.

WELD WITH ARCOS

STAINLESS ELECTRODES

This is a nitric acid absorption column for the chemical industry. The shell and flanges of solid 304 ELC stainless were welded with Arcos CHROMEND 19-9 Cb Electrodes to resist chemical attack at 150 p.s.i.g. and 300°F. Arcos CHROMEND K-LC Electrodes were used for welding the bubble caps and coil clips. Together, these two Arcos Electrodes proved the point: there's no substitute for quality weld metal when long uninterrupted service is essential. ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Pa.



PROGRAM

Tues., Oct. 18—2:00 p.m.

All meetings held in Bellevue-Stratford Hotel.

FAILURE ANALYSIS—II

Chairman: R. D. Wylie, The Babcock & Wilcox Co.

Evaluation of Corrosion Performance, by R. J. Landrum, E. I. duPont deNemours & Co.

Evaluation of Aircraft Performance, by W. E. Anderson and Paul Lorenz, Boeing Airplane Co.

Engineering Approach to Service Performance, by C. Lipson, University of Michigan.

Wed., Oct. 19—2:00 p.m.

All meetings held in Bellevue-Stratford Hotel.

RECENT ADVANCES IN METALLURGICAL MICROSCOPY

Chairman: G. K. Manning, Battelle Memorial Institute.

The Use and Application of the Electron Microscope in Metallurgical Problems, by Professor J. Nutting, Cambridge University.

Quantitative Metallography, by E. E. Underwood, Battelle Memorial Institute.

New Developments in Microscopy, by J. W. Spretnak, Ohio State University.

Thurs., Oct. 20—9:00 a.m.

All meetings held in Bellevue-Stratford Hotel.

EFFECTS OF STRUCTURE ON PROPERTIES—I

Chairman: W. O. Binder, Union Carbide Metals Co.

Effect of Steel Microstructure on Notch Toughness, by R. D. Stout, Lehigh University.

Fracture Toughness and Structure of High Strength Sheet Steels for Pressure Vessels, by H. Bernstein and G. C. Young, U. S. Naval Weapons Plant.

Significance of Heat Treatment Variables on Fracture Characteristics of Quenched and Tempered Steels, by P. P. Puzak, U. S. Naval Research Laboratory.

Structural Effects Associated with Strengthening Low-Alloy Steels by Deforming Austenite, by R. A. Grange and J. B. Mitchell, United States Steel Corp.

Influence of Microstructural Features on the Corrosion Resistance of Several Metals and Alloys, by A. M. Hall and W. K. Boyd, Battelle Memorial Institute.

Thurs., Oct. 20—2:00 p.m.

All meetings held in Bellevue-Stratford Hotel.

EFFECTS OF STRUCTURES ON PROPERTIES—II

Chairman: W. O. Binder, Union Carbide Metals Co.

The Effect of Composition, Structure and Processing on the Properties and Application of 20-80 pct Nickel, Iron-Nickel Alloys, by R. J. Raudebaugh, Iron-Nickel Alloys, The International Nickel Co.

Effect of Structure on Properties of Gray and Ductile Irons, by J. F. Wallace, Case Institute of Technology.

AMP Alloys, by R. J. Towner, Alcoa Research Laboratories.

A Study of Refinement of the Primary Silicone and the Eutectic in Aluminum-21 pct Silicon Alloy, by Y. P. Telang, Ford Motor Co. and M. G. Urdea, Aerojet-General Corp.

Effect of Elevated Temperature Exposure on the Strength Properties and Microstructure of Rene 41 and Astrology, by D. P. Moon, Battelle Memorial Institute, J. F. Barker, General Electric Co. and W. F. Simmons, Battelle Memorial Institute.

Microstructure vs. Property of Titanium Alloys, by E. Bohanek, Titanium Metals Corp.

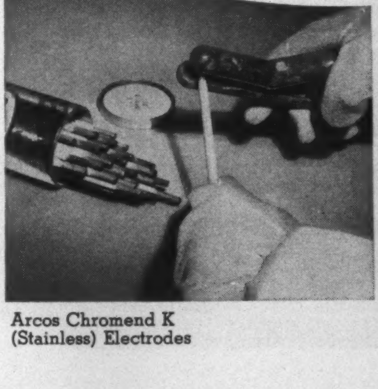
Job report courtesy of
Midwest Piping Co., Inc., St. Louis, Mo.

When stainless welds must pass the most rigid tests possible

USE ARCOS

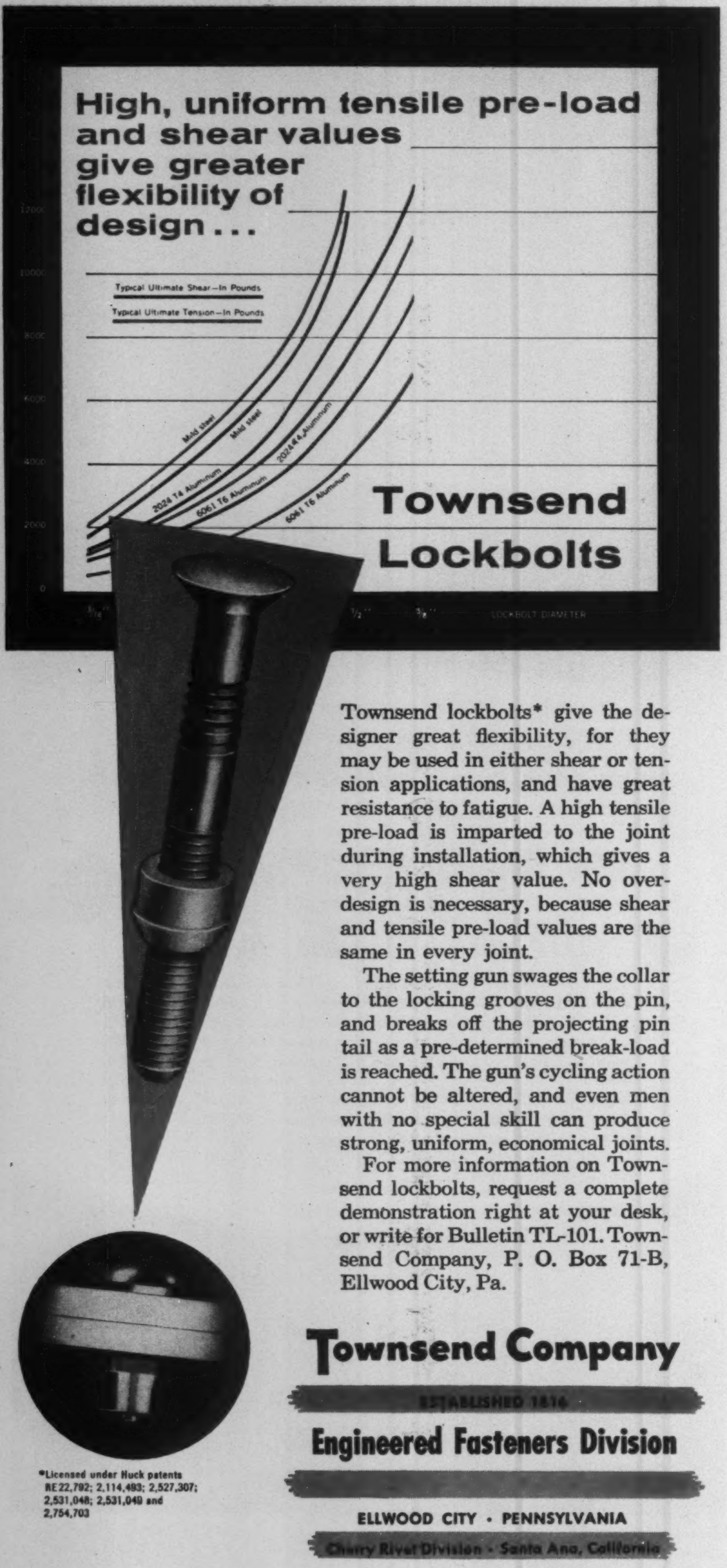
QUALITY FILLER METALS

This 16" diameter Type 304 stainless elbow is part of the reactor cooling system in an atomic powered ship. In welding the two halves, the first pass was made with Arcos Chromend K (Type 308) electrodes. The balance of the joint was submerged arc welded with Arcosite Bonded Flux and Chromenar K (Type 308) wire. The inset shows results of a dramatic test of the Arcos weld metal so produced. A 2½" ring, cut from an elbow, was given the normal bend test—and then completely flattened—without a crack! Such performance is the reason why Arcos is preferred for all tough jobs. ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Pa.



Arcos Chromend K
(Stainless) Electrodes

Arcos Chromenar K Bare Wire
and Arcosite Bonded Flux


High, uniform tensile pre-load and shear values give greater flexibility of design . . .
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6000
4000
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Mild steel
Mild steel
2024 T4 Aluminum
2024 T4 Aluminum
6061 T6 Aluminum
6061 T6 Aluminum
½"
⅝"
LOCKBOLT DIAMETER
Townsend Lockbolts

Townsend lockbolts* give the designer great flexibility, for they may be used in either shear or tension applications, and have great resistance to fatigue. A high tensile pre-load is imparted to the joint during installation, which gives a very high shear value. No over-design is necessary, because shear and tensile pre-load values are the same in every joint.

The setting gun swages the collar to the locking grooves on the pin, and breaks off the projecting pin tail as a pre-determined break-load is reached. The gun's cycling action cannot be altered, and even men with no special skill can produce strong, uniform, economical joints.

For more information on Townsend lockbolts, request a complete demonstration right at your desk, or write for Bulletin TL-101. Townsend Company, P. O. Box 71-B, Ellwood City, Pa.

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AMERICAN SOCIETY FOR METALS—TRANSACTIONS PAPERS

Mon., Oct. 17—9:00 a.m.

All meetings held in Bellevue-Stratford Hotel.

PHYSICAL METALLURGY—I

Presiding Officers: W. R. Upthegrove, The University of Oklahoma and W. R. Opie, National Lead Co.

The Relationship Between the Constitution and Mechanical Properties of Titanium-Rich Alloys of Titanium and Cobalt, by F. W. Yakymyshyn, G. R. Purdy and J. Gordon Parr, University of Alberta, Edmonton, Alberta, and R. Taggart, University of Washington, Seattle.

Self-Diffusion in Nickel Single Crystals, by A. Messner, R. Benson and J. E. Dorn, University of California, Berkeley, Calif.

Solubility of Oxygen in Delta Iron, by E. S. Tankins and N. A. Gokcen, University of Pennsylvania, Philadelphia.

Diffusion of Carbon in Thorium, by D. T. Peterson, Iowa State University, Ames, Iowa.

Yield Point and Order-Hardening Phenomena in Some Commercial "Nickel Silver" Alloys, by V. A. Phillips and R. B. Jones, General Electric Co., Schenectady, New York.

Mon., Oct. 17—2:00 p.m.

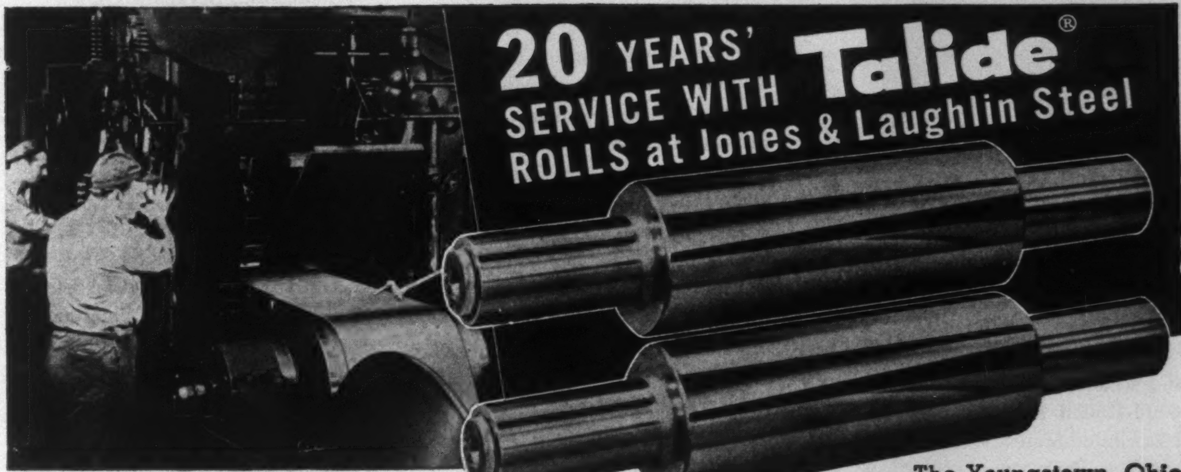
All meetings held in Bellevue-Stratford Hotel.

PHYSICAL METALLURGY—II

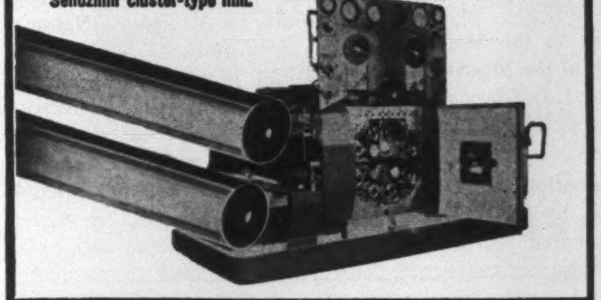
Presiding Officers: R. W. Guard, General Electric Co. and W. C. Winegard, University of Toronto.

. . . ANOTHER TALIDE CASE HISTORY

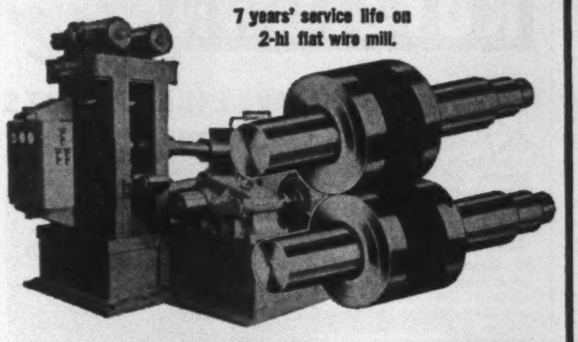
20 YEARS' SERVICE WITH Talide® ROLLS at Jones & Laughlin Steel



The Youngstown, Ohio plant of JONES & LAUGHLIN STEEL CORPORATION'S STAINLESS AND STRIP DIVISION (formerly Cold Metal Products Co.) reports that the TALIDE (Tungsten Carbide) work rolls used on their 4-hi cold rolling mills give INCREASED PRODUCTION, LONG SERVICE, FINE FINISH AND EXTREMELY CLOSE TOLERANCE. Over 25 pairs have been purchased during the past 20-year period —many of which are still in operation producing high quality strip steel of all analyses.



82 times more tonnage rolled on Sendzimir cluster-type mill.



7 years' service life on 2-hi flat wire mill.

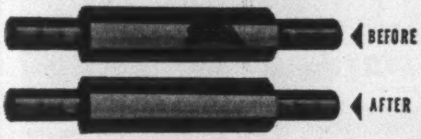
Metal Carbides pioneered and developed the original installations of tungsten carbide rolls and has successfully adapted them to all types of rolling mills including STECKEL, BLISS, UNITED, MESTA, STANAT, SENDZIMIR, WATERBURY-FARREL, TORRINGTON, RUESCH, FENN, WEAN, COLD METAL, LOMA, LOCKWOOD, TAYLOR, etc.

Talide work rolls are ultra-hard, extremely dense and porous-free. Strip steel and non-ferrous metals of all analyses are rolled down to thinner gauge, with more accuracy, greater reductions and with fewer anneals than possible with any other roll.

ONLY TALIDE WORK ROLLS GUARANTEE THESE ADVANTAGES

- ★ MORE PRODUCTION
- ★ BETTER FINISH
- ★ LONGER LIFE
- ★ HIGHER SPEEDS
- ★ CLOSER TOLERANCE
- ★ IMPROVED PHYSICALS
- ★ GREATER REDUCTION
- ★ LESS DOWN TIME
- ★ FEWER REJECTS
- ★ LESS MAINTENANCE

EXCLUSIVE REPAIR SERVICE



Broken or damaged carbide rolls can be reworked to first-class condition with all defects eliminated at one-half original cost. Only Metal Carbides offers this service—because of its exclusive hot press method.

Talide Rolls are made in lengths up to 100" diameters up to 25", and up to 5000 lbs. by weight.

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Youngstown 12, Ohio
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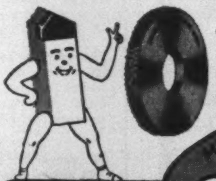

SUPERSET GRINDING WHEEL

The Superset diamond grinding wheel was specially developed for grinding carbide rolls to highest possible surface finish and luster. Made of 4-8 micron size diamond dust, it imparts a surface finish far superior to any other commercial wheel. Available in sizes up to 25" diameter.

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HOT PRESSED AND SINTERED CARBIDES • VACUUM METALS
HEAVY METAL • ALUMINUM OXIDE • HI-TEMP. ALLOYS
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

Gray and White Solidification of Cast Iron, by M. Hillert, Metallografiska Institutet, Swedish Institute for Metal Research, Stockholm O, Sweden.

Laves-Type Phases of Hafnium, by R. P. Elliott, Armour Research Foundation of Illinois Institute of Technology, Chicago.

Effect of Rolling Procedure on the Kinetics of Recrystallization of Cold-Rolled Iron, by J. T. Michalak, United States Steel Corp., Monroeville, Pennsylvania; and W. R. Hibbard, Jr., General Electric Co., Schenectady.

Growth Processes in Recrystallization of Aluminum, by S. Weissmann, Rutgers University, New Brunswick, New Jersey.

Tues., Oct. 18—9:00 a.m.

All meetings held in Bellevue-Stratford Hotel.

PHASE DIAGRAMS

Presiding Officers: T. E. Leontis, The Dow Chemical Co. and D. Ragone, University of Michigan.

The Ternary System Cadmium-Bismuth-Indium, by E. A. Peretti, University of Notre Dame, Notre Dame, Indiana.

The Systems Y-Fe, Y-Ni, and Y-Cu, by R. F. Domagala, J. J. Rausch and D. W. Levinson, Armour Research Foundation.

Phase Equilibria and Properties of Yttrium-Titanium Alloys, by D. W. Bare and O. N. Carlson, Iowa State College, Ames, Iowa.

Columbium-Carbon System, by R. P. Elliott, Armour Research Foundation of Illinois Institute of Technology, Chicago.

Phase Relations in the Magnesium-Rich Region of the Mg-Al-Zn Phase Diagram, by J. B. Clark, The Dow Metal Products Co., Midland, Michigan.

Heats of Formation of Iron-Manganese Alloys, by W. B. Kendall and Ralph Hultgren, University of California, Berkeley, Calif.

Tues., Oct. 18—9:00 a.m.

All meetings held in Bellevue-Stratford Hotel.

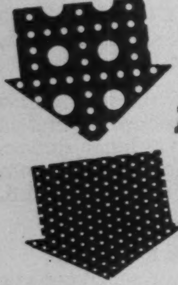
STEEL—I

Presiding Officers: O. O. Miller, The International Nickel Co. and R. B. Boswell, Chrysler Corp.

The Decomposition of Austenite in 4340 Steel During Cooling, by E. P. Klier, The Catholic University of America, Washington, D. C.; and T. H. Yeh, International Business Machines Corp., Poughkeepsie, N. Y.

The Tensile Properties of Type 410 Stainless Steel Deformed Before and After Martensite Transformation, by Y. Hosoi, National Research Institute, Tokyo, Japan, and K. E. Pinnow, The Pennsylvania State University, University Park, Pa.

The Effect of Aluminum on Strain Aging and Internal Friction in Low Carbon Steel, by F. H. Laxar, D. J. Blickwede and J. W.



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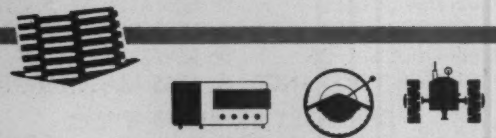

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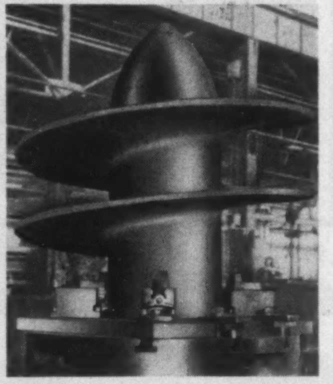

Shown here in our Machine Shop, is one of a number of Screw Pile Points made on our Molding Machines and used to build pier facilities in Central America.

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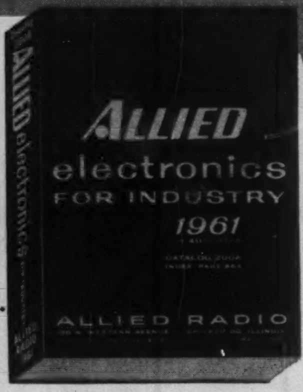

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The Microstructure of Low-Carbon 3.25 pct Silicon Steel, by W. C. Leslie and R. L. Rickett, United States Steel Research Center, Monroeville, Pennsylvania; C. P. Stroble, Allegheny Ludlum Steel Corp., Brackenridge, Pa., and G. Konoval, U. S. Steel Corp., Brackenridge, Pa.

On the Morphology of Proeutectoid Cementite, by R. W. Heckel and H. W. Paxton, Carnegie Institute of Technology, Pittsburgh.

Low Temperature Flow and Fracture Tension Properties of Heat-Treated SAE 4340 Steel, by F. R. Larson and J. Nunes, Watertown Arsenal Laboratories, Watertown, Massachusetts.

Tues., Oct. 18—2:00 p.m.

All meetings held in Bellevue-Stratford Hotel.

STEEL—II

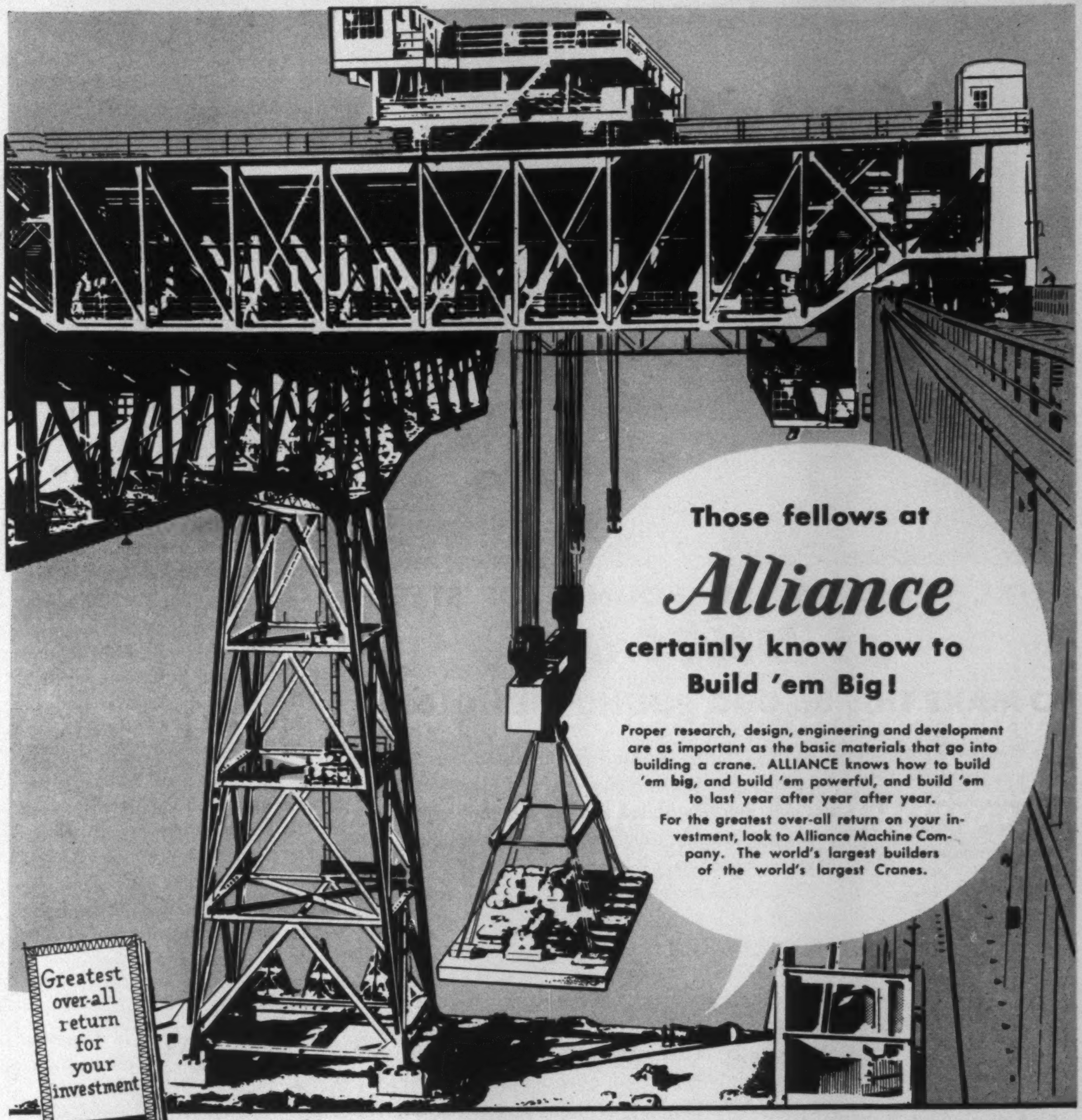
Presiding Officers: G. H. Enzian, Jones & Laughlin Steel Corp. and D. J. Blickwede, Bethlehem Steel Co.

The Effect of Microstructure of the Fatigue Strength of a High Carbon Steel, by F. Borik and R. D. Chapman, Chrysler Corp., Detroit, Michigan.

The Effect of Cold Work and Temperature on Strength and Structure of Steel, by P. Shahinian and M. R. Achter, U. S. Naval Research Laboratory, Washington, D. C.; W. A. Pennington, University of Maryland, College Park, Maryland.

The Effect of Phosphorus on the Elevated Temperature Strength and Weldability of Some Low Carbon Austenitic Stainless Steels, by G. R. Rundell, Crucible Steel Co. of America, Pittsburgh, Pa.; and R. J. Raudebaugh, D & R Div. of The International Nickel Co., Inc., New York.

Size, Manganese Content and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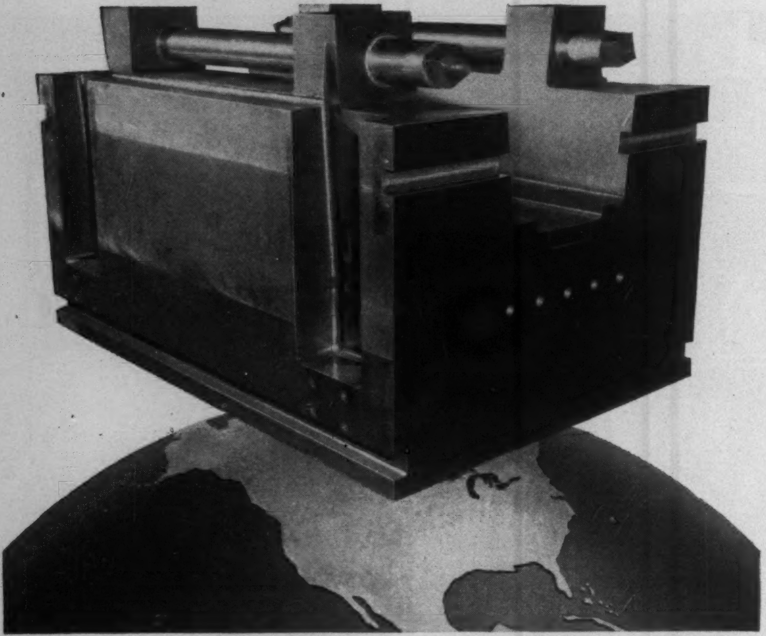

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PROGRAM

Curie Point of Carbides Extracted From Manganese Steel, by R. W. Gurry, Union Steel Corp., Union, N. J.; J. Christakos, Esso Research Laboratories, Linden, N. J.; and L. S. Darken, U. S. Steel Corp., Monroeville, Pennsylvania.

Tues., Oct. 18—2:00 p.m.

All meetings held in Bellevue-Stratford Hotel.

PLASTIC DEFORMATION

Presiding Officers: P. D. Frost, Battelle Memorial Institute and R. L. Whitley, Bethlehem Steel Co.

Yield Point Phenomena in a Number of Commercial Copper Alloys and One Nickel Base Alloy, by R. B. Jones and V. A. Phillips, General Electric Co., Schenectady.

Dynamic Stress-Strain Phenomena and Plastic Wave Propagation in Metals, by R. Papirno and G. Gerard, New York University, New York.

Precipitation of Phosphorus From Alpha Iron and Its Effect on Plastic Deformation, by E. Hornbogen, United States Steel Corp., Monroeville, Pa.

Activation Energies for Basal Slip in Magnesium Single Crystals, by T. A. Trozera, J. Mote and J. E. Dorn, University of California, Berkeley, Calif.

Cylindrical Textures in Tungsten and Other Body Centered Cubic Metals, by S. Leber, General Electric Co., Cleveland.

Wed., Oct. 19—2:00 p.m.

All meetings held in Bellevue-Stratford Hotel.

Presiding Officers: R. F. Hehemann, Case Institute of Technology and S. L. Gertsman, Department of Mines and Technical Surveys.

Preferential Corrosion of Stabilized Stainless Steel Welds, by C. L. Angerman and P. Kranzlein, E. I. Du Pont De Nemours & Co., Aiken, South Carolina.

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Metal Wear by Scoring, by J. H. Olson and R. D. Chapman, Chrysler Corp., Detroit.

Mechanism of Rapid Intergranular Oxidation of 18 Cr—8 Ni Stainless Steels by Oxygen and Dry Sodium Chloride in the Temperature Range 1100°-1400°F, by M. G. Fontana, F. H. Beck and H. W. Pickering, The Ohio State University, Columbus, O.

On the Hardenability Effect of Boron in Steel, by R. A. Grange and J. B. Mitchell, United States Steel Corp., Monroeville, Pa.

The Determination of Hardness in Steels From the Breadth of X-Ray Diffraction Lines, by R. E. Marburger and D. P. Koistinen, General Motors Corp., Warren, Mich.

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HIGH TEMPERATURE MATERIALS

Presiding Officers: T. W. Eichelberger, Westinghouse Research Laboratories and Frank Richman.

The Constitution of Rhenium-Columbium Alloys, by P. Levesque, W. R. Bekebrede and H. A. Brown, Raytheon Mfg. Co., Waltham, Mass.

Beta Transformation Characteristics of Titanium Alloyed with Vanadium and Aluminum, by E. L. Harmon, Electro Metallurgical Co., Niagara Falls, N. Y.; and A. R. Troiano, Case Institute of Technology, Cleveland.

Mechanical Properties of Tantalum-Base Alloys, by F. F. Schmidt, F. C. Holden, H. R. Ogden and R. I. Jaffee, Battelle Memorial Institute, Columbus, O.

A New Series of Nickel Base Alloys for Advanced Temperature Applications, by J. C. Freche, W. J. Waters and T. J. Riley, NASA Lewis Research Center, Cleveland.

High Strength Martensite Steels for Elevated-Temperature Use, by A. Kasak, V. K. Chandhok and E. J. Dulis, Crucible Steel Co. of America, Pittsburgh.

Improvement of the Ductility of Vanadium by Alloying, by D. T. Klodt and C. E. Lundin, University of Denver, Denver.

The Structure and Mechanical Properties of Uranium-Titanium Martensites, by D. L. Douglass, General Electric Co., Schenectady.

Effect of Low Alloy Additions on the Properties of Uranium, by W. H. Friske, H. E. Kline and M. H. Binstock, Fuel Element Development, Atomics International, Canoga Park, California.

Thurs., Oct. 20—2:00 p.m.

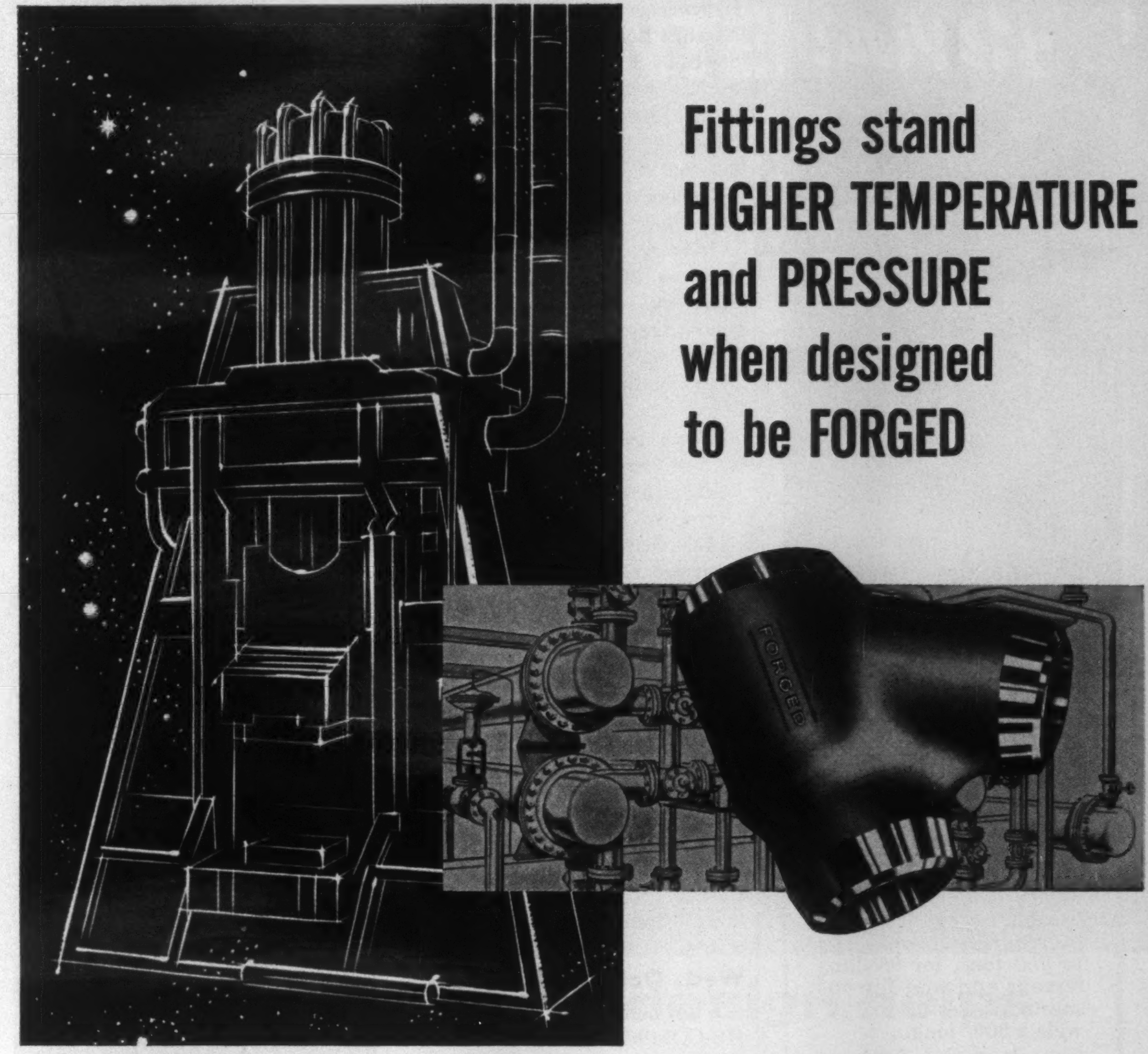
All meetings held in Bellevue-Stratford Hotel.

EMBRITTLEMENT

Residing Officers: D. Krashes, Worcester Polytechnic Institute and S. W. Poole, Republic Steel Corp.

Temperature and Microstructure

Fittings stand HIGHER TEMPERATURE and PRESSURE when designed to be FORGED



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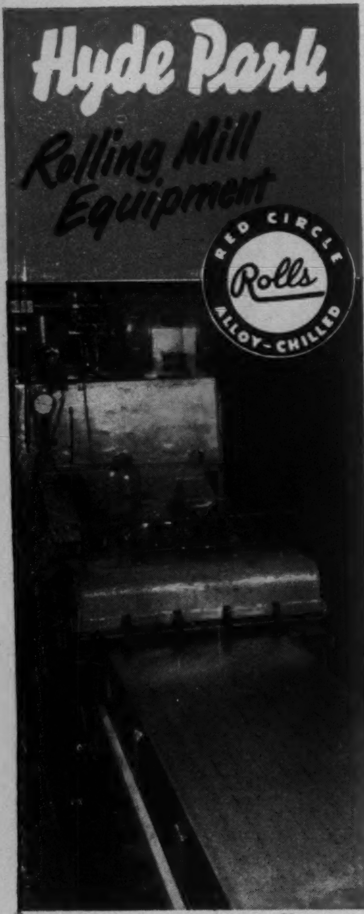

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Dependence of Size Effects in Notched Bend Tests of Some Alloy Steels, by S. Yukawa, General Electric Co., Schenectady.

Embrittlement of High Purity Nickel, by K. M. Olsen, C. F. Larkin and P. H. Schmitt, Jr., Bell Telephone Laboratories, Inc., Murray Hill, N. J.

Influence of Hot-Rolling Conditions on Brittle Fracture in Steel Plate, by F. de Kazinczy, Oxelosunds Jarnverksaktiebolag, Oxelosund, Sweden; and W. A. Backofen, Massachusetts Institute of Technology, Cambridge, Mass.

Effect of Induction Tempering on 500° Embrittlement, by A. Nakashima and J. F. Libsch, Lehigh University, Bethlehem.

The Occlusion of Hydrogen by Annealed Hypoeutectoid Iron-Carbon Alloys, by M. Kotyk and H. M. Davis, The Pennsylvania State University, University Park, Pa.

On the Mechanism of Occlusion of Hydrogen by Cold-Worked Hypoeutectoid Iron-Carbon Alloys, by J. E. Werner and H. M. Davis, The Pennsylvania State University, University Park, Pa.

Hydrogen Embrittlement in Vanadium-Niobium Alloys, by A. L. Eustice and O. N. Carlson, Iowa State University, Ames, Ia.

Wed., Oct. 19—2:00 p.m.

SYMPOSIUM: AUSTENITE DE-COMPOSITION—II

Role of Partition in Austenite Decomposition, by R. I. Entin, Central Research Institute, Moscow.

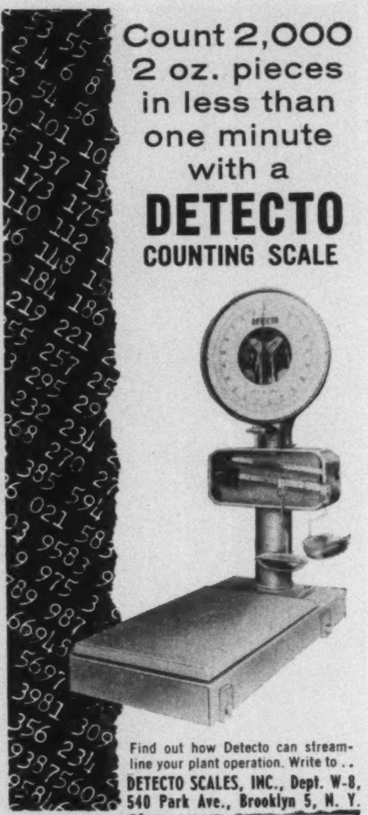
Thermodynamics of Bainite Reaction, by L. Kaufman, Manufacturing Laboratories: S. V. Radcliffe, M. Cohen, M.I.T.

Proeutectoid Ferrite and Cementite, and the Bainite Reactions, by H. I. Aaronson, Ford Motor.

Growth Kinetics of Bainite Reaction, by G. R. Speich, U. S. Steel.

Surface Relief Effects In Ferrite and Bainite Plate Formation, by J. W. Christian, Oxford University.

Proeutectoid, Eutectoid and Peritectoid Transformation in Nonferrous Systems, by C. W. Spencer, Cornell University.



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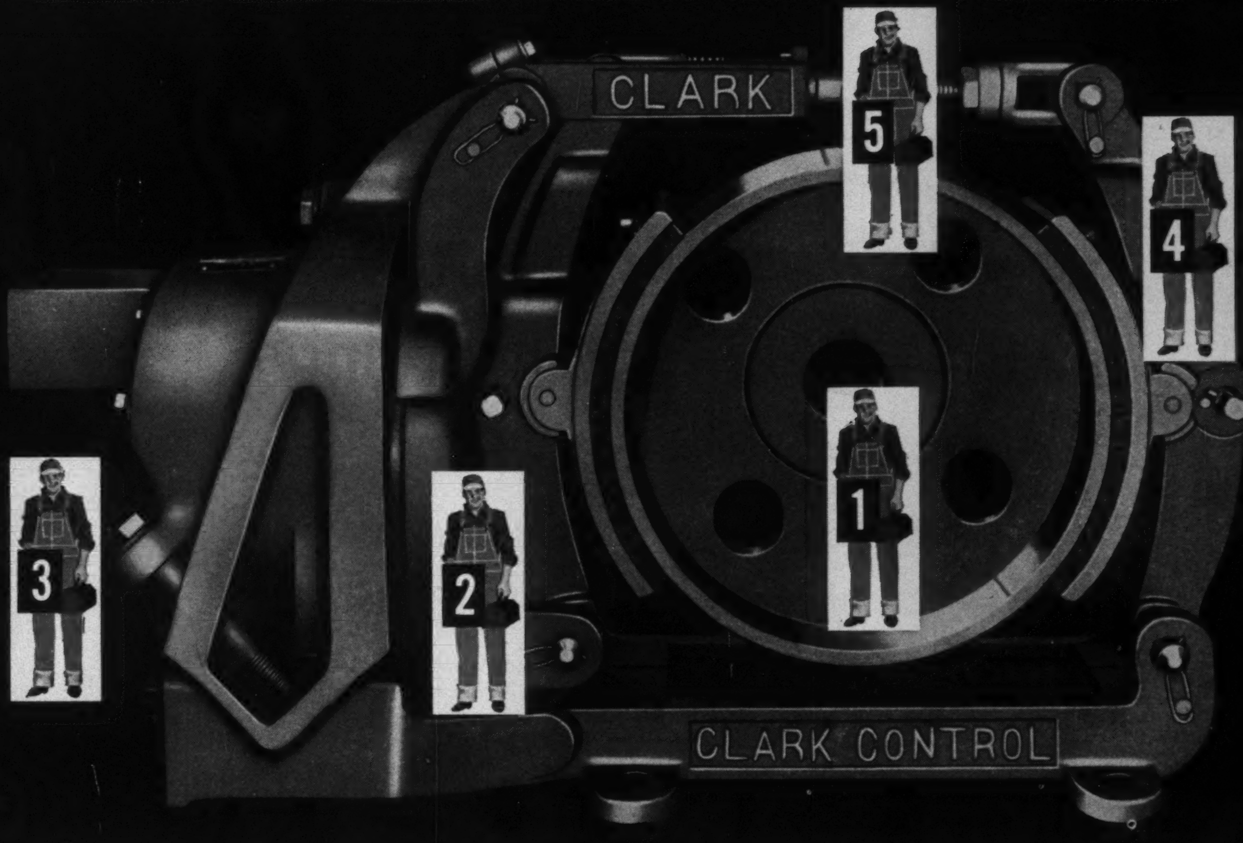

Here's how Clark design helps

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It's the brake troubles that occur *after* thousands of operations that Clark engineers had in mind when they designed the AISE-NEMA D-C Magnetic Brake line.

Hundreds of successful applications attest to the design superiority that has made these brakes the choice of maintenance men wherever service conditions are most rugged.

Clark maintenance-reducing features include:

1 Powerful "nut-cracker" principle of operation, with shoe-arms hinged at top, assures equalized pressure on both shoes, improves lining life.

2 Top-hinging of magnet armature puts widest part of magnet air gap at bottom, so most of the dirt falls free—minimizing stoppages.

3 Magnet case and coil replaceable on the job without affecting brake adjustment or releasing brake. Self-contained, epoxy-potted coil is quickly and easily replaced in the case.

4 Interchangeable self-aligning shoes are readily replaceable and fit either side, either end up.

5 Maintenance adjustment is on *top* of brake for easy access.

PLUS many other Clark "maintenance-saver" features that greatly reduce downtime, speed maintenance, simplify adjustments and replacement of wearing parts.

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"Not one failure in 10 years with USS American springs"

Mr. Lee Dunn, Sales Manager of Walter Balfour & Co., Inc., tells why American Steel & Wire Springs are used in Balfour Doc-Port Rolling Steel Pier doors.

"The springs in our doors have to be exceptionally tough and dependable," says Mr. Dunn. "The performance of the doors is dependent upon the quality of the springs. The springs must act uniformly over their entire length because the doors must be perfectly counter-balanced at every point of travel. Springs of the same wire diameter and coil diameter *must* have identical characteristics. In the ten years we've been using American Steel & Wire springs, we've never experienced a failure.

"Most of the USS American springs used by the Balfour Company are made from 9/16" cold wound wire. In the larger steel pier doors there are actually multiples of our helical torsion spring sizes . . . 5/8", 9/16", 1/2", and 13/32". Springs are nested one within another, each spring mounted on shaped cast anchors which are fixed to a single torsion rod, so that the springs are equally and simultaneously loaded."

When springs are your special problem, come to American Steel & Wire. Our Spring Engineering Service has a solid reputation for coming up with the right answer at the right time. They'll be glad to pitch in on your problem. Give us a call today, or write American Steel & Wire, Dept. 0405, 614 Superior Avenue, N.W., Cleveland 13, Ohio.

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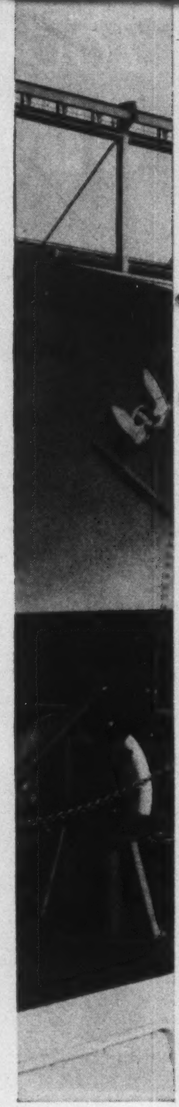
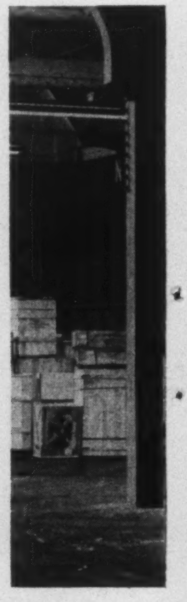
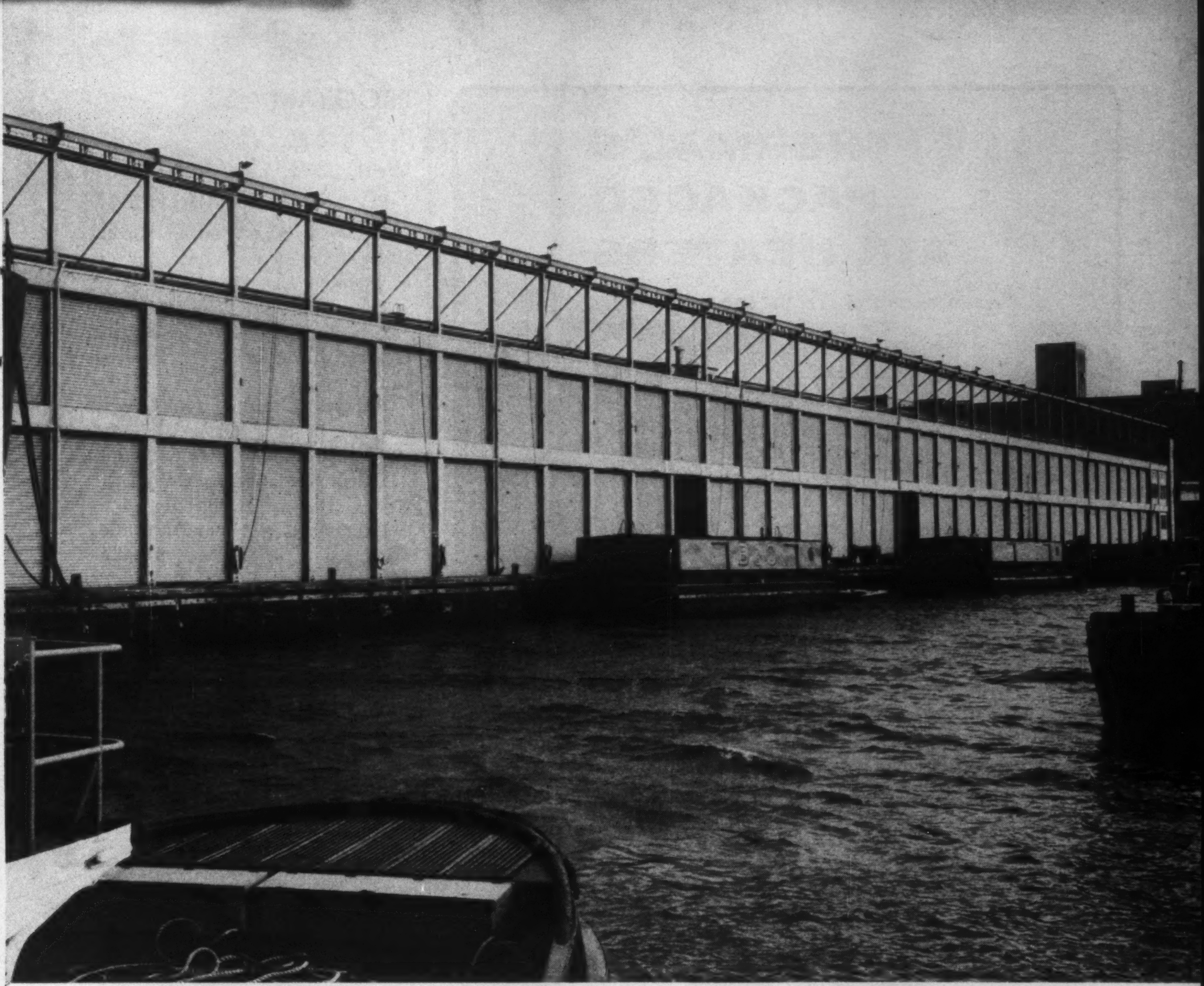
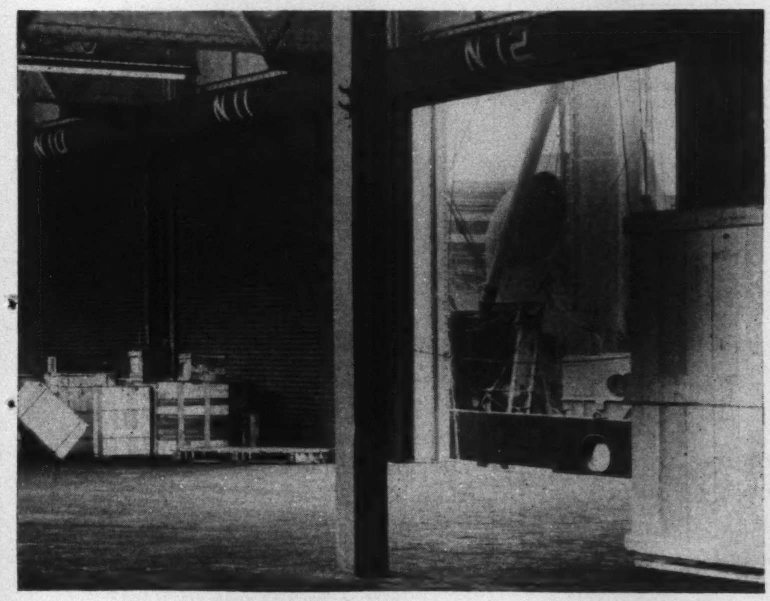
Cold wound springs in Balfour doors are placed inside steel cylinders and fixed on each end to anchors that prevent internal collapsing of the springs at contact points.







Balfour doors are exposed to heavy wind loads and salt water spray, but they can take it—and so can the USS American springs.



3000 lbs. ride on each USS American spring assembly every time these big 18′ x 24′ Balfour Pier doors open and close. It takes rugged, long-lasting springs to stand up under this kind of punishment.

USS

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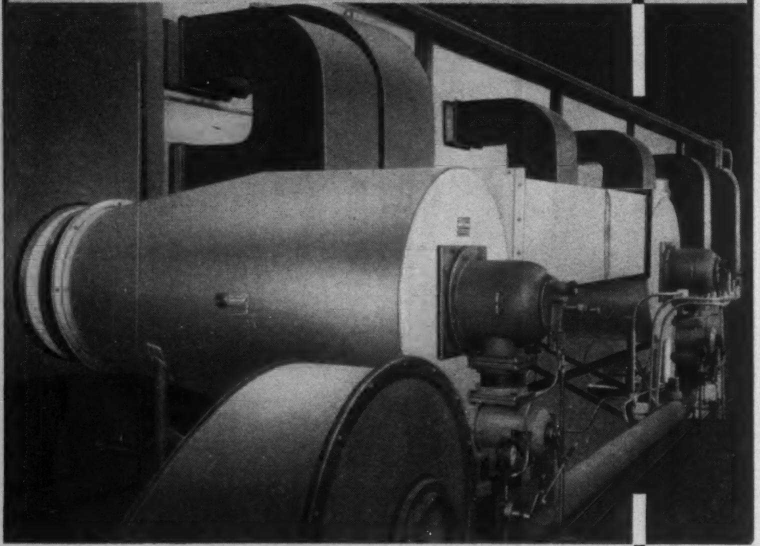
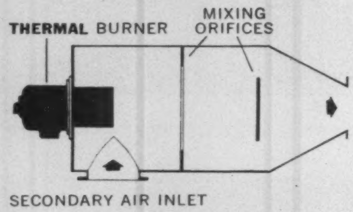


COMPACT...OIL OR GAS FIRED

Extremely versatile design permits the THERMAL Type CA heater to be used in a wide variety of installations and with either gas, oil or combination firing. Shown here is a tunnel dryer installation of the Edgar Plastic Kaolin Co., Edgar, Florida. THERMAL CA air heaters with #7028 burners provide 4,000,000 BTU/hr each using #2 fuel oil. These air heaters are equally adaptable to kilns, ovens, spray dryers and many other installations where products of combustion may be mixed with the air.



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The CA air heater is built around the THERMAL high velocity burner. Because of its unique design, combustion takes place almost entirely within the burner. It normally requires no refractory and provides maximum utilization of available space.

WRITE FOR BULLETIN #104

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THERMAL

Thermal Research & Engineering Corp.

CONSHOHOCKEN • PENNSYLVANIA

REPRESENTATIVES IN PRINCIPAL CITIES

PROGRAM

Wed., Oct. 19—2:00 p.m.

PLASTIC DEFORMATION—I

Frictional Stress on a Moving Dislocation, by K. Wilsdorf, Univ. of Pennsylvania.

Easy Glide and Grain Boundary Effects in Al, by R. L. Fleischer, General Electric; W. F. Hosford, M.I.T.

Rupture of Surface Films on Al Crystals, by R. J. Clock, M. Metzger, Univ. of Illinois.

Latent Hardening in Al, by U. F. Kocks, Harvard University.

Interactions Between Dislocation Families, by B. H. Kear, Franklin Institute.

Microcreep in Zn Single Crystals, by J. M. Roberts, W. March, Rice University; Norman Brown, Univ. of Pennsylvania.

Easy Glide of Pb Single Crystals. by R. L. Fleischer, General Electric.

Plastic Deformation of Pb Single Crystals, by G. F. Bolling, L. E. Hays, H. W. Wiedersich, Westinghouse.

Deformation Stacking Faults in Pb Alloys and Al, by G. F. Bolling, T. B. Massalski, Mellon Institute; C. J. McHargue, Oak Ridge.

Short-Range Order Strengthening in Cu-Al, by T. J. Koppenaal, M. E. Fine, Northwestern University.

Thurs., Oct. 20—9:00 a.m.

REFRACTORY METAL ACTIVITIES IN EUROPE

Refractory Metals Research, by R. I. Jaffee, Battelle.

Sheffield Refractory Metals Meeting, by B. S. Lement, Manufacturing Laboratories, Inc.

AGARD Activities, by N. E. Promisel, W. J. Harris, U. S. Navy.

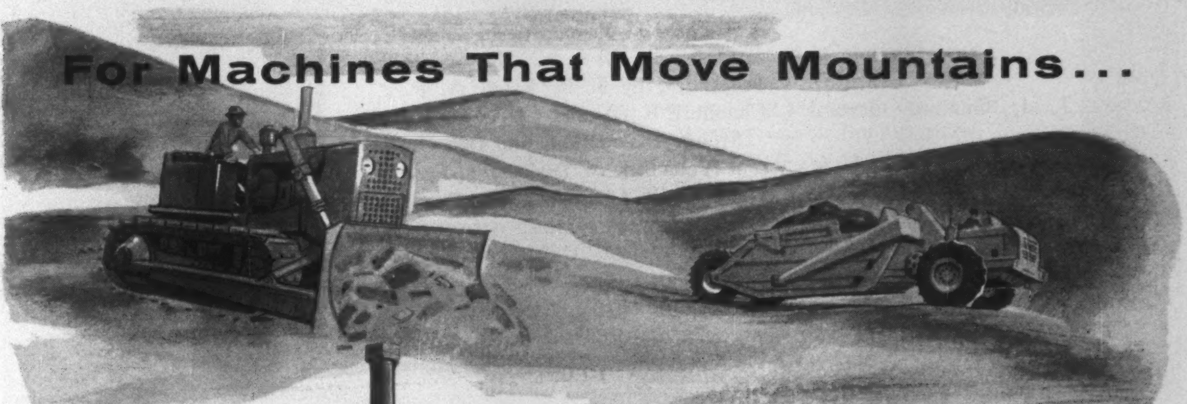
Thurs., Oct. 20—9:00 a.m.

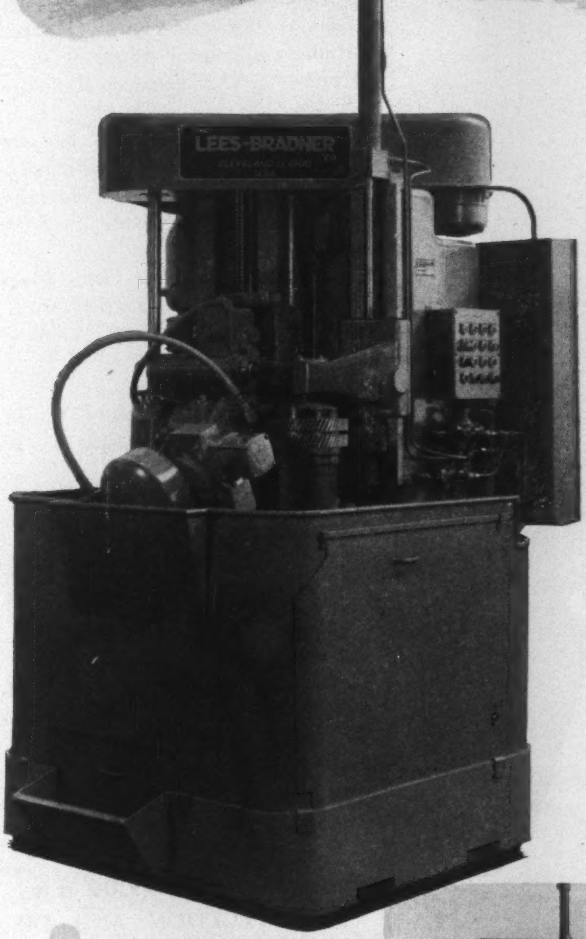
PLASTIC DEFORMATION — II

Strain Rate Studies of Al-Cu at Low Temperature, by J. G. Byrne, M. E. Fine, Northwestern University.

Surface Effects in Crystal Plastic-

For Machines That Move Mountains...





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Now truck, tractor and earthmoving equipment manufacturers can generate heavy-duty gears as efficiently as smaller ones have been made.

Write Lees-Bradner for all the details — or get in touch with our representative in your area.

SPECIFICATIONS

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Max. diameter capacity (with 5″ hob)	12″
Max. helix angle	45°
Taper in work spindle nose	16 B & S
Floor space	60″ x 60″

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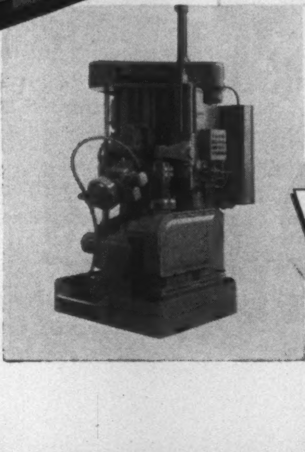

the
LEES-BRADNER
Company
CLEVELAND 11, OHIO, U.S.A.

ity, by J. J. Gilman, General Electric.

Cross-Slip and Cross-Climb of Dislocations, by J. C. M. Li, U. S. Steel.

Temperature Dependence of Field Processes in Fe, by R. Ekvall, N. Brown, Univ. of Pennsylvania.

Recovery of Zone-Melted Fr, by J. T. Michalak, U. S. Steel, H. W. Paxton, Carnegie Institute.

Mechanical Properties of Dislocation-Free Ge vs. Electronic Properties, by J. R. Patel, A. R. Chadhuri, Raytheon.

Mobile Dislocations and Dislocation Velocities of Dislocation-Free Ge, by A. R. Chadhuri, J. R. Patel, L. G. Rubin, Raytheon.

Properties of Tellurium Single Crystals, by R. J. Stokes, T. L. Johnson, C. H. Li, Honeywell.

Plastic Deformation of InSb, by M. A. Abrahams, R.C.A.

Yield and Fracture Stresses of Si Single Crystals, by W. D. Sylwestrowicz, Bell Telephone.

Thurs., Oct. 20—9:00 a.m.

POWDER METALLURGY—I

Ultrafine Metal Powders, by M. Quantinetz, R. J. Schafer, C. Smeal, N.A.S.A.

Effect of Particle Size of Ni and MgO Powder Properties, by R. J. Schafer, M. Quantinetz, J. W. Weeton, N.A.S.A.

Processing Variables vs. Properties for Liquid-Phase Sintered, High-Temperature Alloy, by P. A. Clarkin, J. W. Weeton, P. F. Sikora, N.A.S.A.

Pressing Temperature vs. Agglomeration of MgO in Dispersion-Strengthened Ni-MgO Alloy, by R. J. Schafer, M. Quantinetz, J. W. Weeton, N.A.S.A.

Refractory-Coated Fine Metal Powders, by W. B. Tarpley, C. D. McKinney, W. E. Marceau, Aeroprojects Inc.; G. S. Ansell, T. Rensselaer.

Metal-Bonded Graphite, by M. Humenik, R. L. van Alston, D. W. Hall, Ford Motor.

Thurs., Oct. 20—9:00 a.m.

ENGINEERING FUNDAMENTALS OF ROLLING PROCESS.

Present Status of Theory, by L. F. Coffin, General Electric.

Boundary Conditions at Roll-Material Interface, by G. W. Pearsall, M.I.T.

Resulting Structure and Properties, by W. R. Hibbard, General Electric.

Wed., Oct. 19—9:00 a.m.

PRECIPITATION AND DISPERSED PHASES.

Determination of Number of Particles Per Unit Volume, by R. T. DeHoff, F. N. Rhines, Univ. of Florida.

Nucleation Catalysis by C. Additions to Mg, by V. B. Kurfman, Dow.

Nucleation of Precipitates in Si-Li System, by J. W. Ferman, R. A. Swalin, Univ. of Minnesota.

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HERE'S HOW **PAINTITE**® SCORES ON SURVEY'S 12 "MOST WANTED" FEATURES...

–Formulated as Result of Industry-Wide Survey...

During the first six months of 1959, Turco undertook an extensive survey of the phosphate coating market. Hundreds of users of these coatings were interviewed. Thousands of questions were asked. When the answers were tabulated, Turco began the task of building an iron phosphate process to the *exact specifications* called out in the survey.

The new process is now available. It is called Turco Paintite. Paintite has been thoroughly field-tested in the production lines of a dozen Turco customers. It has passed the most severe tests with flying colors. Turco is proud to announce the addition of Paintite to its ten other Turcoat phosphate and conversion coating processes that provide a better bond for organic finishing.

1. **SUPERIOR CLEANING**–Exclusive wetting system provides heavy-duty uniform cleaning. Cleans & phosphates simultaneously.
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4. **LESS POST RUST**–Eliminates post rusting problem often encountered with iron phosphate processes.
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6. **ECONOMICAL**–Low in initial cost. Low in maintenance cost. Low in cost per sq. ft. Long-lived, even under mass production use.
7. **UNIFORM COATING**–even on edges and points. Won't show through on low-pigmented paints.
8. **USE VERSATILITY**–used by immersion, spray washer or steam cleaner.
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10. **RESERVE ACIDITY** – combats alkaline water conditions. Constant control not necessary.
11. **SUPERIOR SERVICE** – by Turco's vast network of technically trained servicemen, located in industrial centers throughout the world.
12. **REQUIRES ONLY 3 STAGES**–for dip or spray washing. Can be efficiently used in 5-stage operations, if desired.

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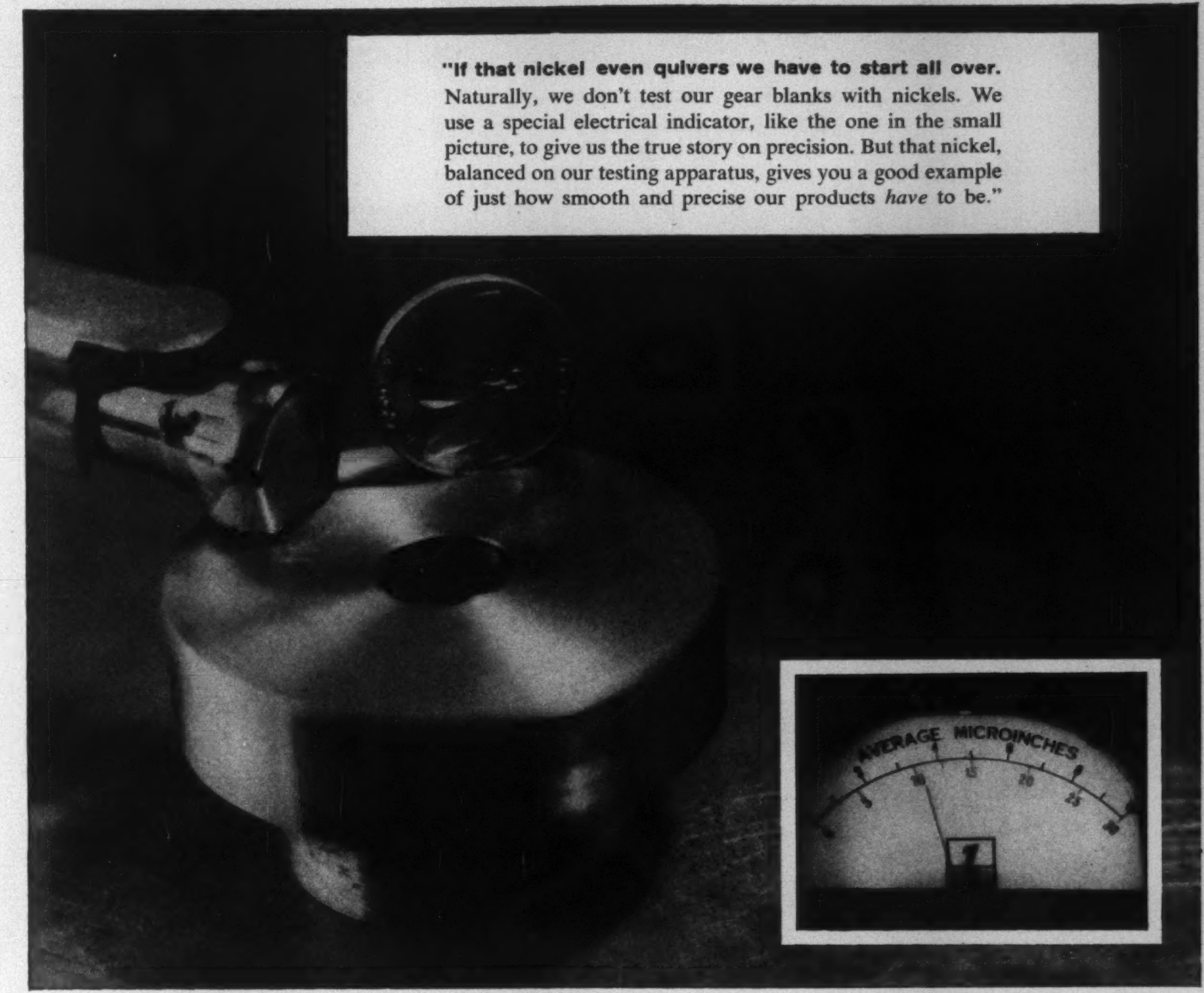

"If that nickel even quivers we have to start all over. Naturally, we don't test our gear blanks with nickels. We use a special electrical indicator, like the one in the small picture, to give us the true story on precision. But that nickel, balanced on our testing apparatus, gives you a good example of just how smooth and precise our products *have* to be."

"We depend on Cities Service for absolute precision!"

Lester E. Hoffmann, Treasurer and Vice-President
American Screw Machine Products Co., Chicago, Ill.

"The screw machine business is a highly competitive trade. We've built our business and our reputation on top quality, high-precision products . . . gear blanks that require the closest tolerances in *all* aspects. That means *we have to have* the best-quality cutting oil available. We've depended on Cities Service for nearly 25 years and they've never let us down."

"Matter of fact," says Mr. Hoffmann, "they insisted we try other brands just to prove that Cities Service was the best for us. They proved their point. We've stuck with Cities Service."

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If you use petroleum products in your operations, why not talk with your Cities Service Lubrication Engineer? He can help you get the most from your operations by giving you the finest products, the best service available. Or if you prefer, write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

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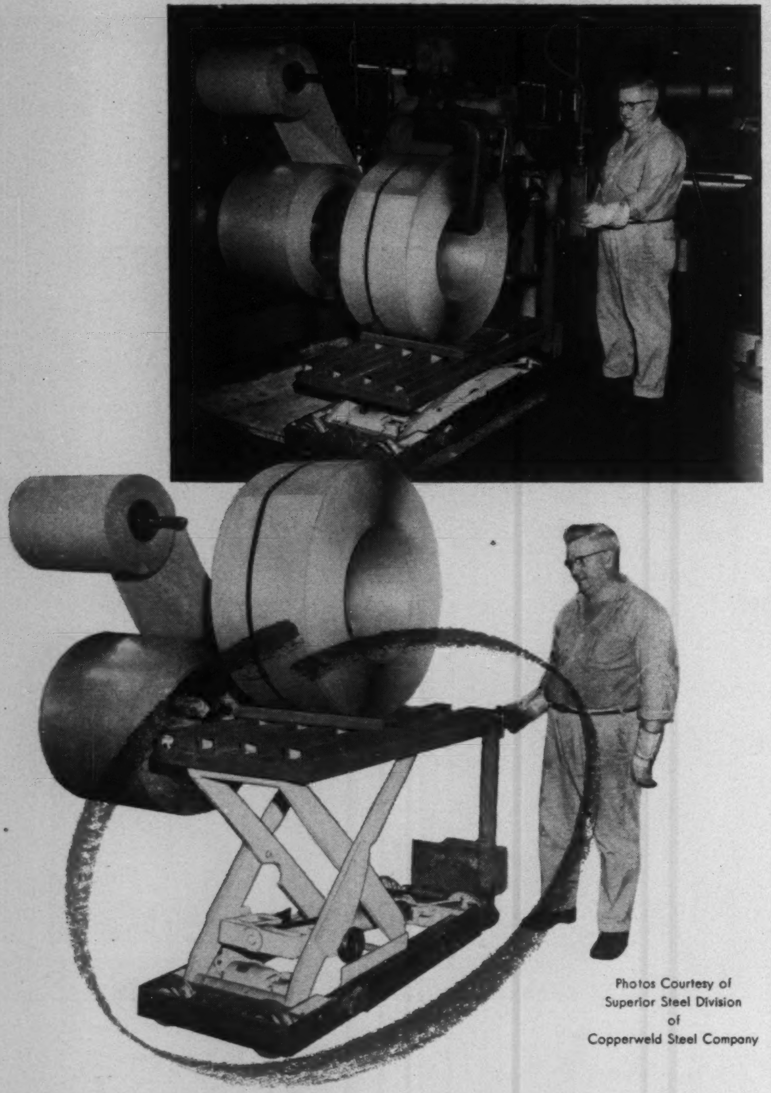

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Unidirectionally Solidified Al-CuAl$_2$ Eutectic, by R. W. Kraft, D. L. Albright, United Aircraft.

Relationship Between Precipitate and Matrix in Co-Ti Alloys, by R. W. Fountain, G. M. Faulring, W. D. Forgeng, Metals Research Lab.

Electrolytic Dispersion Hardening, by W. H. Meiklejohn, R. E. Skoda, General Electric.

Temperature vs. Yield Behavior of Al-Al$_2$O$_3$ Alloys, by F. V. Lenel, G. S. Ansell, R. A. Bosch, Rensselaer.

Precipitation of C from Fe, by R. H. Doremus, General Electric.

Precipitation of N in Fe Containing Mn, by J. F. Enriette, J. & L. Steel.

Prior Heat Treatment vs. Carbon Strain Aging, by J. F. Butler, J. & L. Steel.

Wed., Oct. 19—2:00 p.m.

REFRACTORY METALS

Purification of W by Electron Beam Melting, by H. G. Sell, Westinghouse.

Properties of W. Alloys Up to 1925°C, by E. L. Harmon, Union Carbide.

Recrystallization of W, by E. L. Harmon, W. D. Gorgeng, Union Carbide.

Recovery in W vs. Impurities, by R. C. Koo, Westinghouse.

Yield Point in W, by R. C. Koo, Westinghouse.

Transition Temperature of W, by J. L. Orehotsky, General Telephone Laboratories.

Properties of Cb, by A. L. Mincher, W. F. Sheely, Union Carbide.

Oxidation of Cb, by W. T. Hicks, DuPont.

Wed., Oct. 19—2:00 p.m.

CREEP, FATIGUE AND FRACTURE

Creep of Aluminum Oxide Alloy, by G. A. Ansell, F. V. Lenel, J. C. Yen, Rensselaer.

Grain Boundary Sliding in Pb, by P. R. Strutt, Franklin Institute.

Surface Energies of Crystals, by

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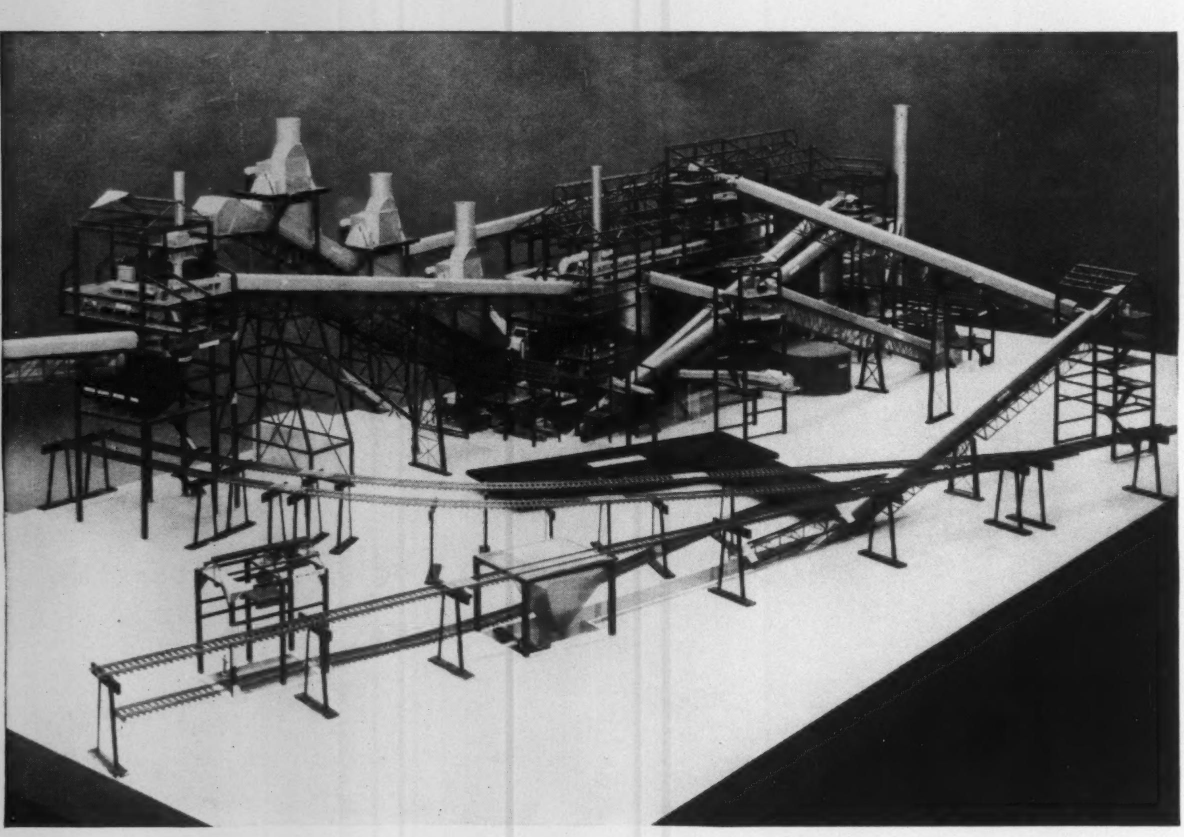

Scale model of the newest Dravo-Lurgi sintering plant, now under construction for Interlake Iron Corporation.

47,500 tons per day

Dravo-Lurgi Sintering and Pelletizing Plants, some still under construction, will produce in excess of 15,500,000 tons of sinter or pellets per year.

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Saxonburg	United States Steel Corp.	3	15,000 tpd
Ashland	Armco Steel Corp.	1	2,400 tpd
Trenton #1	McLouth Steel Co.	1	2,100 tpd
Trenton #2	McLouth Steel Co.	1	2,100 tpd
Copper Cliff, Ont.	International Nickel Co.	1	1,100 tpd
Under Construction			
Chicago	Interlake Iron Corporation	1	3,300 tpd
Aliquippa	Jones & Laughlin Steel Corporation	1	6,500 tpd
		Total:	47,500 tpd

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PROGRAM

J. J. Gilman, General Electric.

Properties of Al_2O_3 Whiskers, by S. S. Brenner, General Electric.

Fracture Behavior of MgO, by A. R. C. Westwood, Research Institute for Advanced Studies.

Cyclic Leading on MgO, by A. J. McEvily, N.A.S.A.; E. S. Machlin, Columbia University.

Fatigue Cracks in Al Crystals, by T. H. Alden, General Electric; W. A. Backofen, M.I.T.

Suppression of Cleavage Fracture In Co-Fe Alloy, by C. W. Chen, Westinghouse.

Fracturing of Metals Coated with Hg, by N. A. Tiner, Douglas.

Wed., Oct. 19—2:00 p.m.

POWDER METALLURGY—II

Sintering of Oxide Particles Produced by Calcination of Salts, by K. Iwase, T. Takada, T. Hayashi, Kyoto University.

Early Stages of Sintering, by M. Herman, G. E. Spangler, Henri Amar, Franklin Institute.

Ni Activated Sintering of W. Powder, by J. H. Brophy, L. A. Shepard, J. Wulff, M.I.T.

Growth of Al_2O_3 in Ni Matrix, by F. V. Lenel, J. Dromsky, G. S. Ansell, Rensselaer.

Shrinkage of Cu Compacts, by F. V. Lenel, H. H. Haunser, E. Hayashi, G. S. Ansell, Rensselaer.

Wed., Oct. 19—2:00 p.m.

TEXTURES, RECRYSTALLIZATION AND RECOVERY

Secondary Recrystallization in High-Purity Fe, by C. G. Dunn, J. L. Walter, General Electric.

Secondary Recrystallization in Si-Iron, by T. V. Philip, R. E. Lenhart, Crucible.

Growth of Oriented Grains in Si-Iron, by J. L. Walter, C. G. Dunn, General Electric.

Growth Rates of Secondary Grains in Si-Iron, by K. Foster, J. J. Kramer, G. W. Wiener, Westinghouse.

Recrystallization of Fe and Fe-Mn Alloys, by W. C. Leslie, F. J. Plecity, J. T. Mickalak, U. S. Steel.

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PROGRAM

Recovery of Metals Under Stress, by P. H. Thornton, Univ. of Pennsylvania; R. W. Cahn, Univ. of Birmingham.

Recrystallization Kinetics of a Cold Rolled Crystal, by W. R. Hibbard, W. R. Tully, General Electric.

Annealing Temperature vs. Preferred Orientation in High-Purity Pb, by K. T. Aust, J. W. Rutter, General Electric.

Annealing Twins in Zone-Refined Al, by K. T. Aust, General Electric.

Temperature Dependence of Rolling Textures in Ag, by H. Hu, R. S. Cline, U. S. Steel.

Evolution of Textures in FCC Metals, by Y. C. Liu, R. H. Richman, Ford Motor.

METALLURGICAL SOCIETY OF AIME

All meetings held in Sheraton Hotel.

Mon., Oct. 17—9:00 a.m.

THERMODYNAMICS, PHASE EQUILIBRIA AND STRUCTURE

Thermodynamics of Solid Fe, by P. D. Anderson, R. Hultgren, University of California.

Statistical Description of Phase Distribution, by D. E. Gucer, Brown University.

Phase Diagram of Bi_2Te_3-Sb_2Te_3 System, by J. R. Wiese, R. Pyle, Franklin Institute.

Structural Study of Ag Sb Te_2, Speaker to be announced.

Miscible Laves - Type Compounds, by J. B. Darby, Jr., Argonne.

Isothermal Section of the Cr-Zr-O System at 1200° C, by C. Hwu, Michael Hoch, University of Cincinnati.

Zr-Rich Corners of the Zr-Co-O and Zr-Ni-O Systems, by M. V. Nevitt, J. W. Downey, Argonne.

AB_3 in Binary and Ternary Transition Element Systems, by A. E. Dwight, Argonne.

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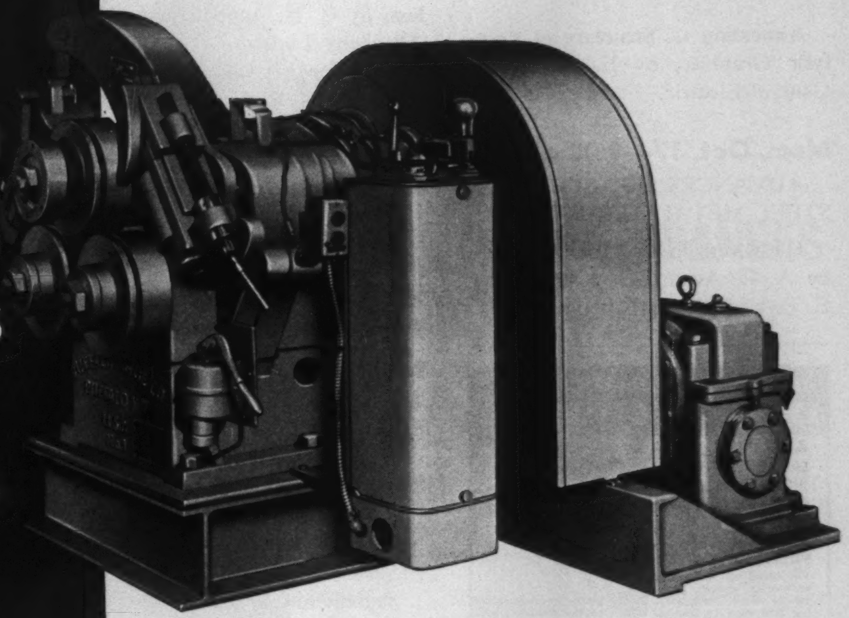

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PROGRAM

Annealing vs. Structure of Pyrolytic Graphite, by E. R. Stover, General Electric.

Mon., Oct. 17—9:00 a.m.

ADVANCES IN STAINLESS STEEL METALLURGY I

Hardening in 17-7 PH Stainless, by A. E. Austin, G. K. Manning, E. E. Underwood, Batelle.

ADVANCE PNEUMATIC
EYE-BATH BOTTLE

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Influence of Carbides on Transformation of Semi-Austenitic Stainless, by G. N. Aggen, R. A. Lula, Allegheny Ludlum.

Carbides in Austenitic and PH Stainless, by R. J. Bendure, L. C. Ikenberry, J. H. Waxweller, Armco.

Submicroscopic Structures in Tempering 410 Stainless, by J. J. Hauser, J. M. Capenos, B. R. Banerjee, Crucible.

Creep-Rupture, by F. Garofalo, R. W. Whitmore, W. F. Domis, F. von Gemmingen, U. S. Steel.

Mon., Oct. 17—9:00 a.m.

INGOT STRUCTURE CONTROL—I

Ingot Structure Control, by W. A. Tiller, Westinghouse.

Solidification in Undercooled Metals, by J. L. Walker, General Electric.

Segregation in Alloy Ingots, by J. W. Holladay, Battelle.

9:00 A.M. DIFFUSION—1

Diffusion in Magnetic Materials, by C. E. Birchenall, Univ. of Delaware.

Self-Diffusion in Ag-Au Alloys, by L. Slifkin, Univ. of N. Carolina; W. Mallard, Emory University.

Simultaneous Plastic Strain, by R. Balluffi, Univ. of Illinois; J. Darby, Argonne; C. Tomizuka, Univ. of Arizona.

Mon., Oct. 17—2:00 p.m.

IMPERFECTIONS, GRAINS AND SURFACES

Direct Observation of the Dislocation Structure in an Al-Al_2O_3 Alloy by Transmission Electron Microscopy, by G. S. Ansell, Rensselaer; Erwin Eichen, Allegheny Ludlum.

Transmission Electron Microscopy Studies on Ultramicrotomed Metals, by V. A. Phillips, General Electric.

Radiation Hardening in Cu Single Crystals, by I. G. Greenfield, H. G. F. Wilsdorg, Franklin Institute.

Direct Observations on Twinning and Grain Growth in Austenite by Thermionic Emission Electron Mi-

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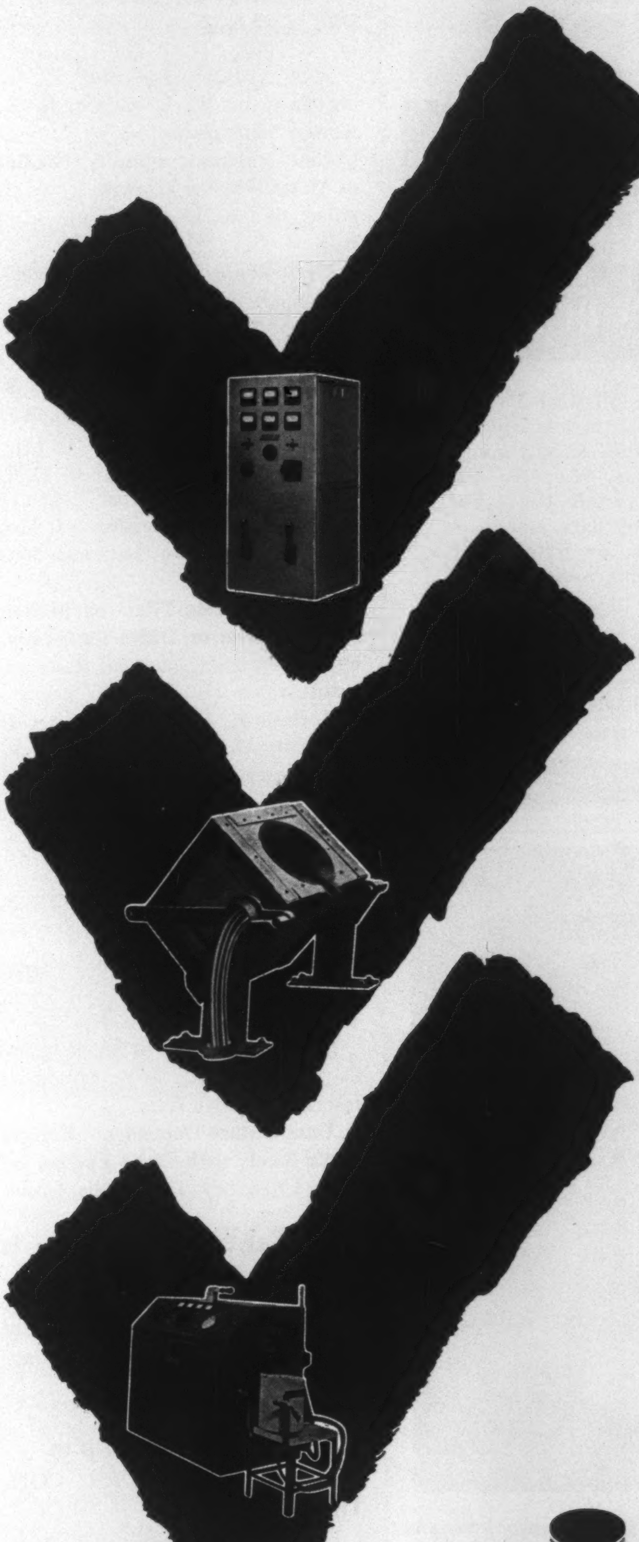

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IDEA #3 . . . *Design Innovations:* Inductotherm has consistently been first with new features in furnace design. Tilting furnace power feed through the trunions is one example, Heliarc welded furnace construction is another.

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If you'd like more information on Inductotherm furnaces, write for Bulletin 70. But, for a taste of Inductotherm service, ask to have an engineer call. Inductotherm Corporation, 412 Illinois Avenue, Delanco, New Jersey.

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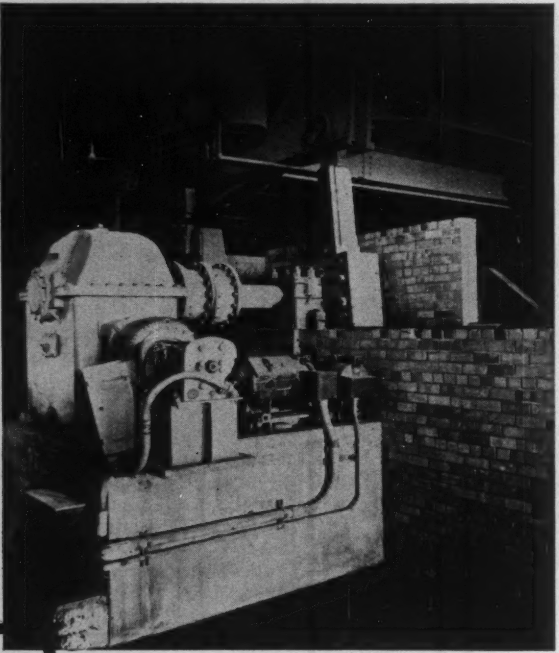
Tilting 700-tons of steel furnace



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Powerful Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

croscopy, by W. L. Grube, S. R. Rouze, General Motors.

Cine Photomicrographic Studies of Metal Whisker Growth, by W. J. Allan, W. W. Webb, Union Carbide.

Dislocations in Zn, by V. V. Damiano, G. S. Tint, Franklin Institute.

Dislocation Etch Pits on (0001) Surface of Zn Crystals, by H. S. Rosenbaum, M. M. Saffren, General Electric.

Surface Markings on Al, by J. M. Lommel, General Electric.

Etch-Pit Characteristics of Mo, by M. A. Adams, A. Iannucci, Materials Research Corp.

Primary Oxide Films on Molten Metals—Electron Diffraction Study, by G. Shimaoka, National Research Institute.

Technique for Studying Oxide Films on Al, by P. E. Doherty, P. C. Johnson, R. S. Davis, Arthur D. Little Inc.

Mon., Oct. 17—2:00 p.m.

ADVANCES IN STAINLESS STEEL METALLURGY—II

Composition vs. Stress—Corrosion Cracking, by D. van Rooyen, Westinghouse.

Sub-Zero Rolling of Stainless, by D. W. McDowell, J. R. Mihalisin, International Nickel.

Temperature-Dependent Fatigue in Cr Steels with Delta Ferrite, by V. K. Chandhok, E. J. Dulis, Crucible.

Effect of B on Hot Ductility in Austenitic Stainless, by F. K. Bloom, E. E. Denhard, Armco.

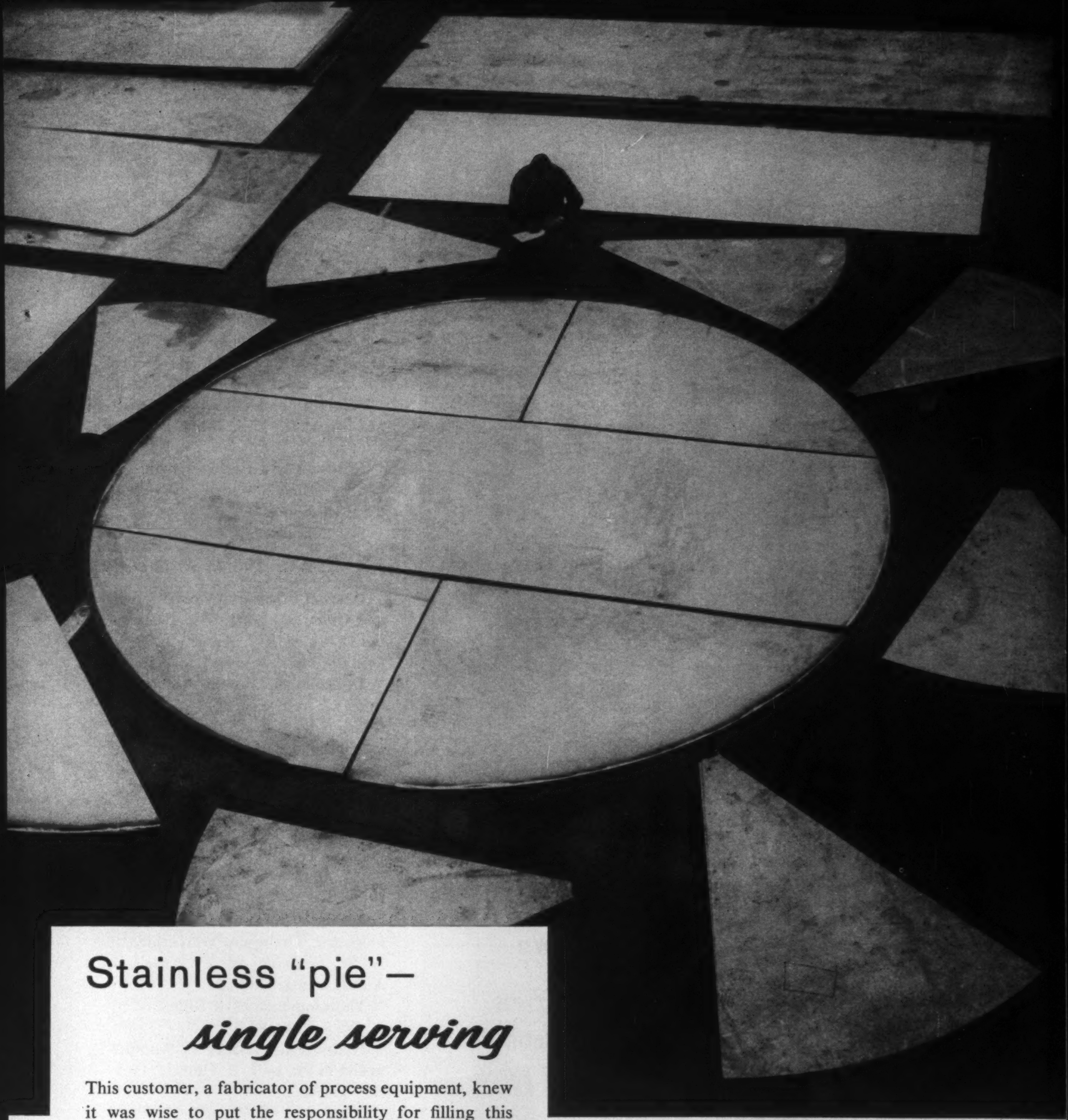
Effect of Delta Ferrite on Hot Cracking, by F. C. Hull, Westinghouse.

Mon., Oct. 17—2:00 p.m.

INGOT STRUCTURE CONTROL—II

Small-Scale Experiments as Full-Scale Production, by B. Chalmers, Harvard University.

Unidirectional Solidification of



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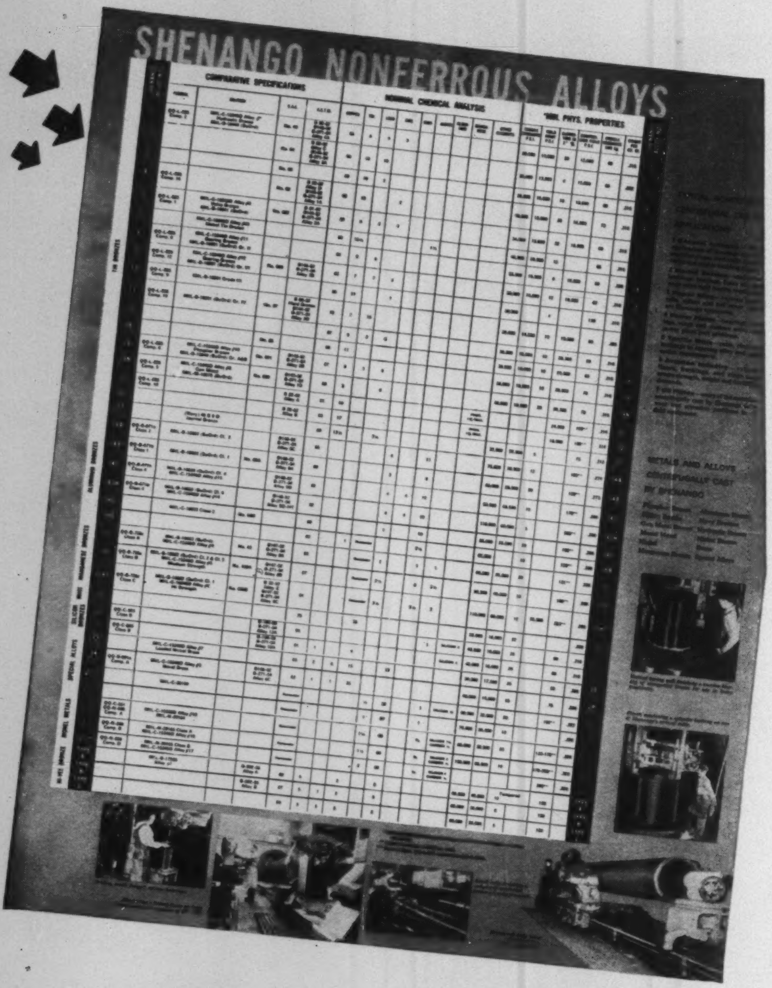

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Steel Ingots, by M. C. Flemings, S. Z. Uram, R. V. Barone, H. F. Taylor, M.I.T.

Mathematical Description of Solidification, by E. L. Foster, B. Fletcher, C. K. Franklin, Battelle.

Mon., Oct. 17—2:00 p.m.

DIFFUSION—II

Quantum Effects on Diffusion of H in Metals, by W. R. Heller, I.B.M.

Solubility and Diffusivity of H in Mo, by M. L. Hill, Johns Hopkins University.

Diffusion in a Ferromagnetic Alloy, by James Stanley, C. A. Wert, Univ. of Illinois.

Self-Diffusion of Fe and S in Ferrous Sulphide, by R. H. Condit, Univ. of California.

Internal Friction of Cold Worked and Quenched Steel, by I. Tamura, Osaka University; T. Mura, J. O. Brittain, Northwestern University.

Diffusion in Liquid Amalgams, by P. C. Mangelsdorf, Jr., Univ. of Chicago.

Internal Friction in Liquid Metals, by G. Abowitz, Cornell University; R. B. Gordon, Yale University.

Self-Diffusion of Ge in Pure and Doped Crystals, by H. Widner, G. R. Gunther-Mohr, A. S. Nowick, I.B.M.

Thermal Diffusion in Non-Stoichiometric Zirconium Dihydride, by A. W. Sommer, W. F. Dennison, Atomics International.

Thermodynamics of Diffusion, by R. W. Keyes, IBM.

Hydrostatic Pressure vs. Self-Diffusion in Ph, by J. B. Hudson, General Electric.

Mon., Oct. 17—2:00 p.m.

METALLURGY IN THE ARMY—REQUIREMENTS, APPLICATIONS AND RESEARCH

Introductory Remarks, by W. J. Ely, Army Research Office.

Metallurgical Research in Europe, by L. G. Klinker, Army Research Office.

PROGRAM

Light Armor Materials, by H. P. George, Frankford Arsenal.

Point Defects in Pure Ni, by J. J. Antal and Allen Goland, Ordnance Materials Research Office.

Dilute Binary Transition Element Solutes in Fe, by E. P. Abrahamson, Watertown Arsenal.

High Pressure—High Temperature Piston Assembly, by A. A. Giardini, J. E. Tydings, U. S. Army.

Tues., Oct. 18—9:00 a.m.

TITANIUM

Phase Transformation During Heat Treatment of Ti-6A1-4V, by P. J. Fopiano, Manufacturing Laboratories, Inc.; M. B. Bever, B. L. Averbach, M.I.T.

Grain Boundary Segregation of C, N, O, in Ti, by J. Winter, Olin Mathieson; I. Cado Cadoff, New York University.

Zone-Refined Ti, by G. E. Spangler, M. Herman, Franklin Institute.

Deformation Textures of Ti, by P. A. Albert, Westinghouse; Y. C. Liu, Ford Motors; I. Cadoff, New York University.

Tues., Oct. 18—9:00 a.m.

PHASE TRANSFORMATION

Martensite (225) Transformation in Fe, by C. M. Wayman, T. A. Read, Univ. of Illinois; J. E. Hanafee, International Nickel.

Martensitic Transformation in Fe Single Crystals, by J. F. Breedis, W. D. Robertson, Yale University.

Isothermal Transformation of Austenite by Thermionic Emission Electron Microscopy, by S. R. Rouze, W. L. Grube, General Motors.

Stress-Induced Martensitic Transformation of Austenitic Stainless Low Temperature, by R. P. Reed, C. J. Guntner, R. L. Greeson, National Bureau of Standards.

Transformation of Gray-Tin Single Crystals, by R. G. Wolfson, M. E. Fine, A. W. Ewald, Northwestern University.

Physical Damage to Pu from Thermal Cycling, by R. D. Nelson, General Electric.

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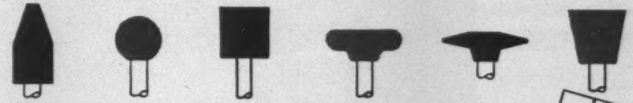

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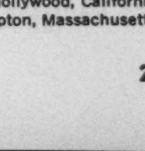

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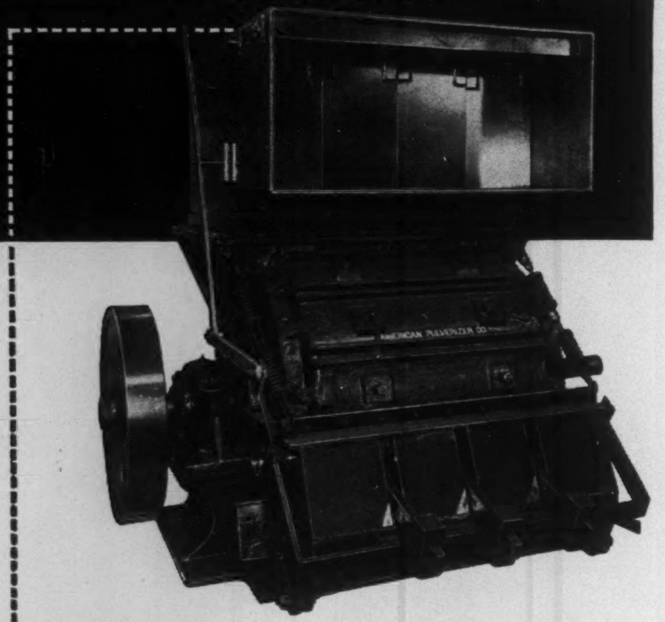

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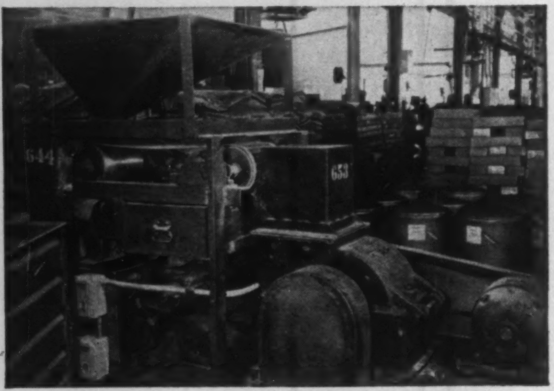

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PROGRAM

Tues., Oct. 18—9:00 a.m.

PROCESS SIMULATION

Predicting Blast Furnace Operation With Computer, by A. L. Hodge, Linde.

Correlation Analysis of Roof Lance Operations in Open Hearth, by A. P. Woods, Armco.

Computer Simulation of Melt Shop Operation, by A. Neate, W. J. Dacey, Steel Co. of Wales, Ltd.

Tues., Oct. 18—9:00 a.m.

EFFECT OF EXTREMELY HIGH PRESSURES—I

Static Pressure Research in Metallurgy, by J. E. Hilliard, General Electric.

Phase Transitions of Pure Metals at High Pressures, by G. C. Kennedy, Univ. of California.

Shock Waves in High Pressure Studies, by G. R. Cowan, DuPont.

2:00 P.M. TITANIUM VS. STEEL AND ALUMINUM IN PRESSURE VESSELS

Evaluation of Fracture Toughness, by W. S. Pellini, J. E. Strawley, U. S. Naval Research.

Pressure Vessels for Space, by V. W. Cooke, R. C. Powell, Pratt and Whitney.

Ductility in Aerospace Pressure Vessels, by G. Gerard, New York University.

Pressure Vessels for Hydrospace, by G. Sorkin, U. S. Navy.

Film: "March of Titanium" (Titanium Metals Corp.)

Tues., Oct. 18—2:00 p.m.

PANEL DISCUSSION ON HOT EXTRUSION

Introduction, by P. Loewenstein, A. Geary, Nuclear Metals, Inc.

Lead, by F. A. C. Shaw ASARCO.

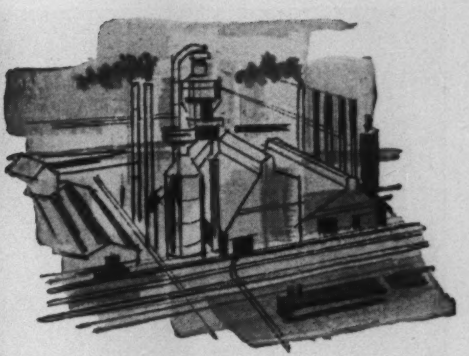
Aluminum, by M. E. Molitor, Kaiser.

Magnesium, (to be announced).

Copper, by T. S. Howald, Chase Brass.

Nuclear Materials, by A. White, Nuclear Metals, Inc.

Summary, by P. Loewenstein, Nuclear Metals, Inc.



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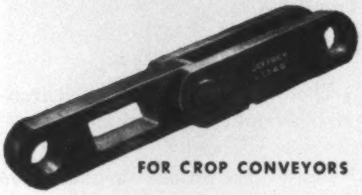

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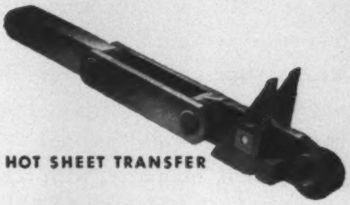
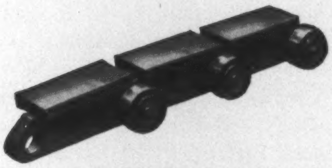
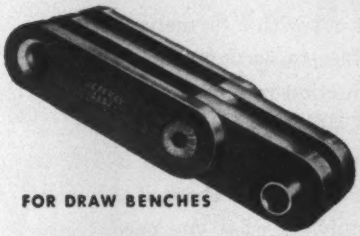


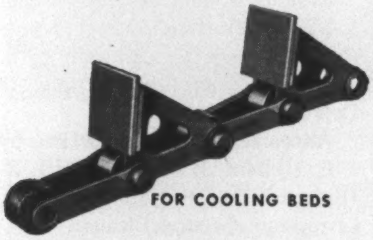
FOR HOT SHEET TRANSFER



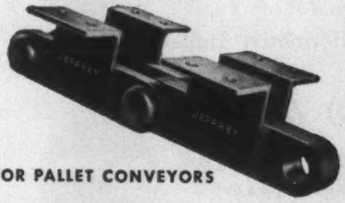
FOR HOT COIL CONVEYORS



FOR DRAW BENCHES



FOR COOLING BEDS



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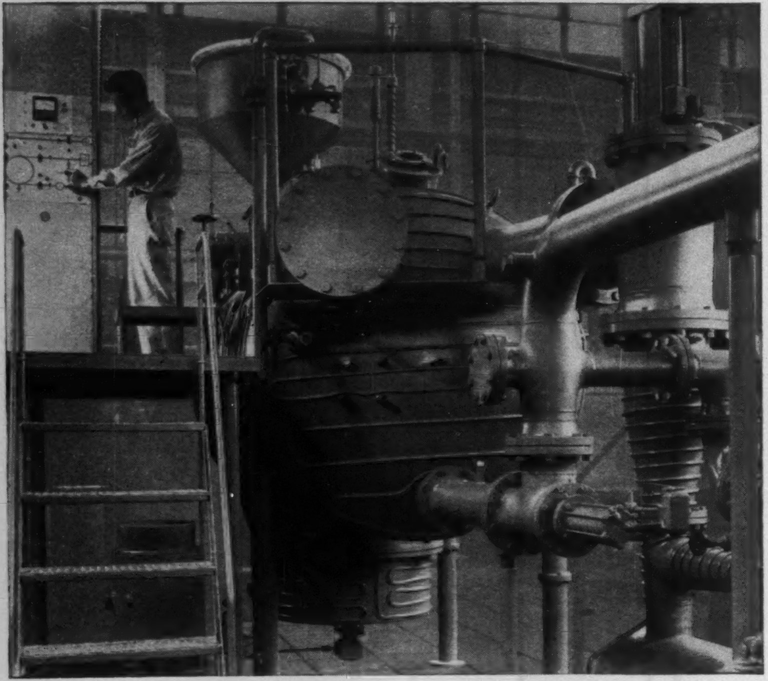

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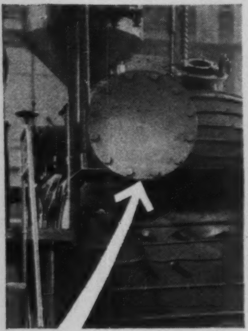

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PROGRAM

Tues., Oct. 18—2:00 p.m.

PHYSICAL CHEMISTRY

McWane Process for Making Iron, by T. E. Ban, McDowell Co., Inc.; B. W. Worthington, McWane.

Kinetics of Iron Oxide Reduction, by A. Wilhelem, G. St. Pierre, Ohio State University.

Sulphide Inclusions in Steel, by L. van Vlack, D. K. Riegger, R. J. Warrick, J. M. Dahl, Univ. of Michigan.

Phase Equilibrium of Synthetic Nonmetallics in FeO-MnO-MnS-SiO_2 System, by E. H. Silverman, U. S. Steel.

Chromium vs. S Activity in Liquid Fe, by N. R. Griffing, G. W. Healy, Union Carbide.

Tues., Oct. 18—2:00 p.m.

EFFECTS OF EXTREMELY HIGH PRESSURES—II

Phase Transformations in Fe-C System, by S. V. Radcliffe, M. Schatz, S. A. Kulin, Manufacturing Laboratories, Inc.

Shock-Pressure Induced Phase Transition in Fe, by P. C. Johnson, B. A. Stein, R. S. Davis, Arthur D. Little, Inc.

Phase Changes in Fe by Differential Thermal Conductivity, by W. F. Claussen, General Electric.

Phase Transitions in Solidified Gases, by J. W. Stewart, Univ. of Virginia.

Recrystallization, by L. E. Tanner, S. A. Kulin, Manufacturing Laboratories, Inc.

Age Hardening Characteristics of Cu-Be-Ni Alloy, by V. A. Phillips, General Electric.

X-Ray Diffraction, by L. S. Kasper, General Electric.

Residual Effects of Pressure and X-Ray Diffraction of Al Single Crystals, by R. E. Zumwalt, L. P. Skolnick, J. R. Ferron, Univ. of Delaware.

Annealing LiF, Al, Cu, Fe, by J. E. Hilliard, J. M. Lommel, J. B. Hudson, D. F. Stein, J. D. Livingston, General Electric.

Deformation of Al and Cu Single

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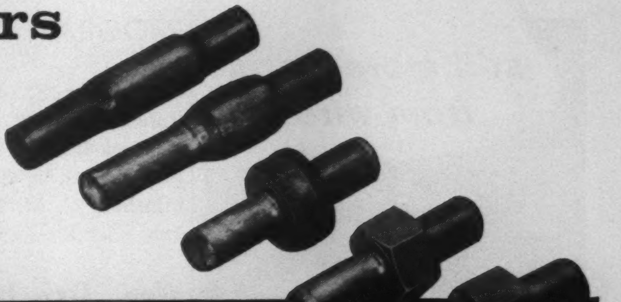

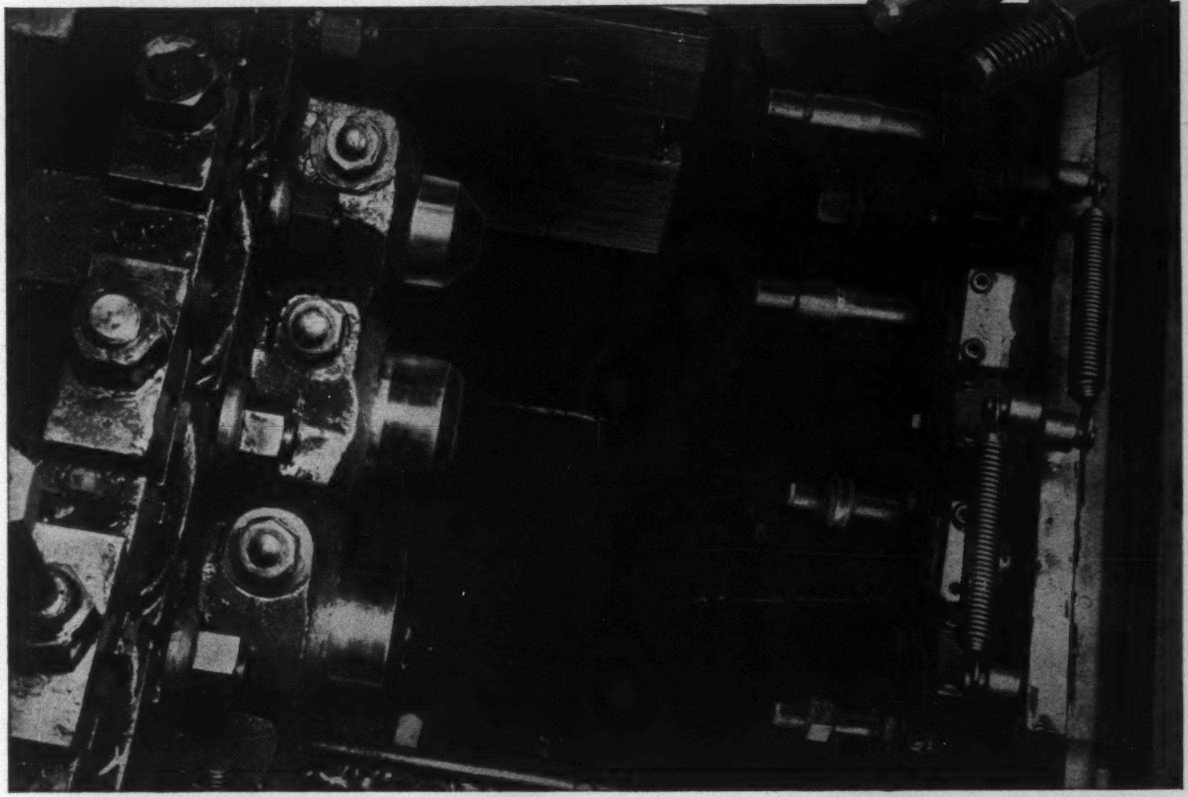

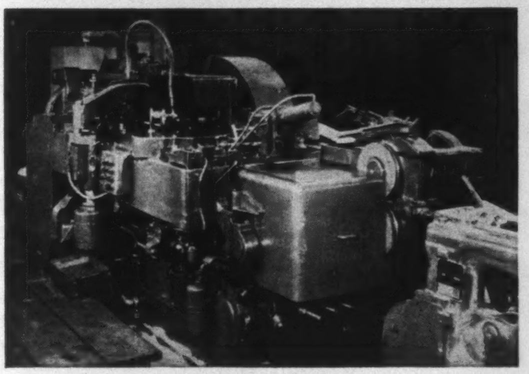

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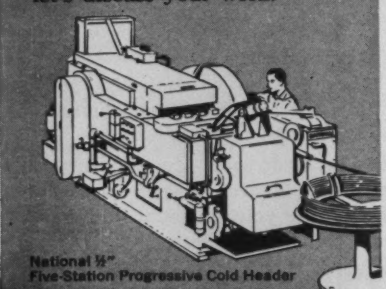
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Crystals, by C. M. Glass, Ballistic Research Labs.

Shock-Induced Transition in Fe-Base Alloys, by E. G. Zukas, E. S. Minshall, C. M. Fowler, Los Alamos Scientific Lab.

Wed., Oct. 19—9:00 a.m.

DIFFUSION CONTROLLED PROCESSES

Grain Boundary Migration in Pb, by J. L. Walter, General Electric.

Grain Boundary Relaxation in Al-Al_2O_3 Alloy, by G. S. Ansell, P. E. Arnold, R. P. I.

Anelastic Behavior of a Dilute Al-Mg Alloy, by B. S. Berry, I.B.M.

Effect of NiO Dispersions on Oxidation of Copper, by J. A. Sartell, C. H. Li, Minneapolis-Honeywell.

Oxidation of Thin Metallic Films at High Temperature, by G. Shimoaka, National Research Institute.

Surface Graphitization of FeC Alloys, by G. R. Speich, U. S. Steel.

Diffusion of Interstitials in Ceramic-Refractory Metal Composites, by M. L. Hill, Johns Hopkins University.

Wed., Oct. 19—9:00 a.m.

METALLIC MODERATORS AND CLADDING MATERIALS—I

Zircaloy Tubing for Cladding Nuclear Fuel, by R. C. Aungst, K. M. Haws, P. L. Farnsworth, General Electric.

Zircaloy-2 Tubing, by H. H. Klepfer, C. N. Spalaris, General Electric.

Zircaloy-4, by J. N. Chirigos, S. Kass, W. W. Kirk, G. J. Salvaggio, Westinghouse.

Hydriding Process for Zr Alloys, by R. E. Westerman, General Electric.

Zr Cladding Alloys for Pressurized Water Reactors, by D. L. Douglass, General Electric.

Zr Alloys for Cladding Fuel Elements, by R. K. Wagner, Atomics International.

High Temperature Cladding Alloys, by J. F. Collins, J. A. McGurty, General Electric.

Aluminum Powder Metallurgy Products, by E. G. Kendall, W. H. Friske, Atomics International.

Wed., Oct. 19—9:00 a.m.

GASSES IN METALS

Control of Oxygen in Copper, by W. F. Harris, J. Easha, Westinghouse.

Effect of H on Mechanical Properties of Mo, by W. Liebmann, R.C.A.

Hydrogen Yield Point in Fe, by M. L. Hill, Johns Hopkins University.

Effects of H in Fe, by A. S. Tetelman, C. N. J. Wagner, W. D. Robertson, Yale University.

Trapping H in Cold Worked Steel, by H. H. Podgurski, U. S. Steel.

Precipitation of He in Al, by G. T. Murray, Materials Research Corp.

Helium in Uranium, by A. Boltax, Westinghouse.

Wed., Oct. 19—9:00 a.m.

AUSTENITE DECOMPOSITION—I

Nucleation in Solid-Solid Transformations, by J. N. Hobstetter, Univ. of Pennsylvania.

Diffusion Growth in Solid-Solid Transformations, by J. S. Kirkaldy, McMaster University.

Pearlite Reaction, by J. W. Cahn, W. C. Hagel, General Electric.

Pearlite Formation, by M. Hillert, Swedish Institute for Metals Research.

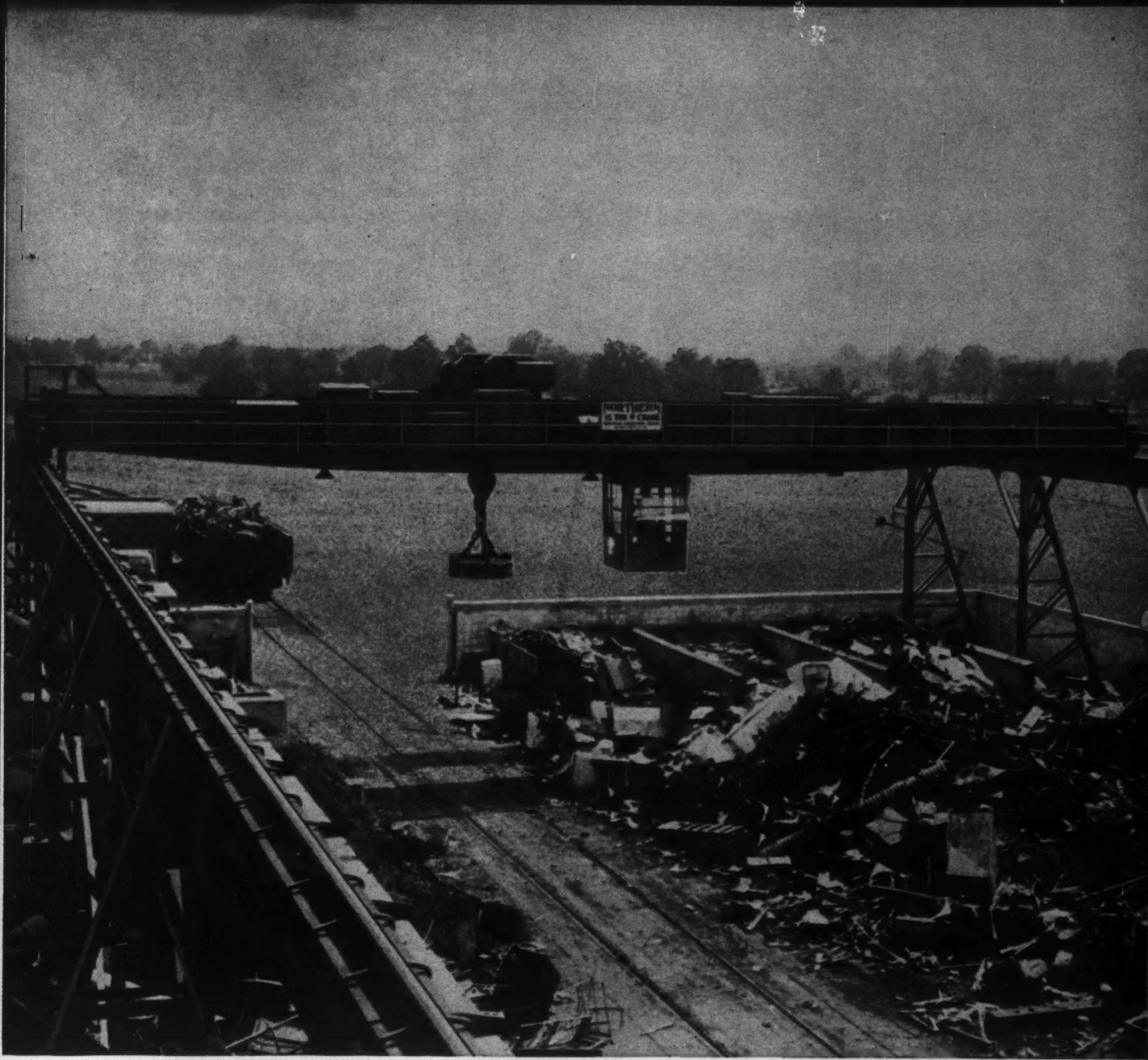
Electromicroscopic Study of Pearlite Reaction, by L. S. Darken, R. M. Fisher, U. S. Steel.

METAL TREATING INSTITUTE

All meetings held in Bellevue-Stratford Hotel.

Thurs., Oct. 20—9:00 a.m.

PANEL: HEAT TREATING COMPONENTS FOR SPACE AGE PRODUCTS



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These magnet handling, heavy duty Northern yard cranes handle scrap continuously in many scrap yards, foundries, steel mills and industrial plants.

NORTHERN CRANES — in this and many similar installations — assure: (1) higher operating speeds for faster turnover of salvage materials as related to yard space; (2) dependable, continuous operation with minimum service and maintenance because of heaviest duty type fittings and equipment; (3) safer, more effective crane operation because of better visibility from Northern's Clear Vision Control Cab; and (4) lower cost operation because oil bath lubrication minimizes crane idle time and wear in load bearing parts.

This 15-ton, 80-foot span, magnet handling crane has A.C., full magnetic, counter torque lowering with motor generator set mounted on crane footwalk.

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DEPT. 1 ERIE, PA.

PROGRAM

Vacuum Heat Treating, by R. Krogh, Ipsen Laboratories.

Heat Treating Specifications, by J. Benedict, Benedict-Miller Co.

ULTRASONIC MANUFACTURERS ASSOCIATION

All meetings held in Bellevue-Stratford Hotel.

Thurs., Oct. 20—2:00 p.m.

Dissimilar Metal Joining by Ultrasonics, by R. S. Ames, Aeroprojects.

Developments in Ultrasonic Equipment, by M. Damast, Narda Ultrasonics.

New Applications, by A. Valente, Westinghouse.

Cleaning Shot-Blasted Strip, by H. Osterman, Branson Ultrasonics.

SPECIAL LIBRARIES ASSOCIATION

All meetings held at John Bartram Hotel.

Thurs., Oct. 20—2:00 p.m.

SYMPOSIUM: JOINING METALS

Fundamentals of Inert-Gas Shielded Consumable-Electrode Process, by I. D. Holster, Air Reduction.

Inert Gas Tungsten Welding in Aircraft and Missiles, by H. S. Davis, Air Reduction.

Silver Brazing, by D. C. Herrschaft, Handy & Harman.

Fri., Oct. 21—9:00 a.m. and 2:00 p.m.

First and Second Session of ASM Metals Engineering Institute Metallurgy Course—Fundamental Concepts of Metallurgy.

PROGRAM

Sat., Oct. 22—9:00 a.m. and 2:00 p.m.

Third and Fourth Sessions of ASM-MEI Metallurgy Course — Advancing Frontiers in Metallurgy.

METAL POWDER INDUSTRIES FEDERATION

Wed., Oct. 19

All meetings held in Bellevue-Stratford Hotel.

Sintered Brass, by V. Tarr, Midwest Sintered Products Corp.

Ceramic Molds, by D. W. A. Forbes, Hamilton Porcelains Ltd.

Thin Walled Cones, by R. Powell and L. Zalesk, Frankford Arsenal.

Iron Powder by Fluidized Bed Method, by A. B. Backensto, Alan Wood Steel.

METAL SHOW EXHIBITORS

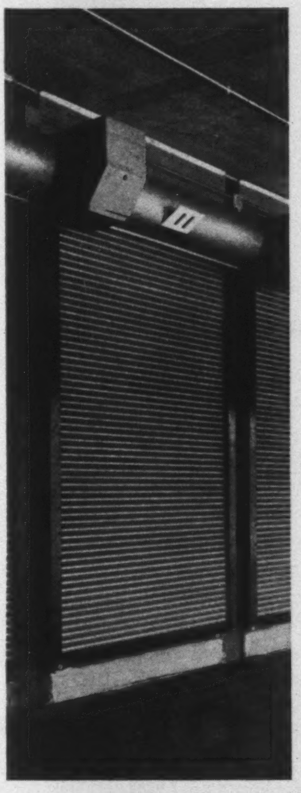
FERROUS METALS

Exhibitor	Booth
Allegheny Ludlum Steel Corp.	114
Babcock & Wilcox Co. Tubular Products Div.	312
J. Bishop & Co., Platinum Works	1829
Braeburn Alloy Steel Corp.	203
Brooklyn Steel Warehouse Co.	1870
Canada—Dept. of Trade & Commerce	1510
The Carpenter Steel Co.	222
Cooper Metallurgical Assoc.	1864
Crucible Steel Co. of America	346
Firth Sterling Corp.	103
General Alloys Co.	930
Great Lakes Steel Corp.	246
International Nickel Co., Inc.	122
Jones & Laughlin Steel Corp. Stainless & Strip Div.	335
Latrobe Steel Co.	119
National-Standard Co.	1377
National Steel Corp., Enamelstrip Div.	246
Republic Steel Corp.	214
Timken Roller Bearing Co. Timken Steel & Tube Div.	129
Ulbrich Stainless Steels	109
Universal-Cyclops Steel Corp.	305
Vanadium-Alloys Steel Co.	320
Vanadium Corp. of America	204
Washington Steel Corp.	146
Westinghouse Electric Corp.	702

Kinnear Motor Operated **Rolling Doors...**

a feature of Theo. Hamm Brewing Company's

Automated Loading Dock



Here again, Kinnear Rolling Doors play a key role in *modern efficiency at its best!*

The 23 power-operated Kinnear Rolling Doors you see above are controlled independently from a master switch.

Conveyors ending just inside each door deliver pallets holding cases of beer to the loading dock. The door can then be opened by remote control. A fork truck picks up the pallets, travels onto dock levelers (at right, top photo) and loads the pallets on the waiting truck.

(Empty cases on pallets are returned to other conveyors through doorways installed higher above the dock level.)

By opening straight upward and coiling compactly over the doorway Kinnear Rolling Doors permit conveyors to come within *inches* of the door. Doors can be placed as close together as desired, with control switches at each door if preferred.

(Auxiliary chains, for door operation in case of power failure, are stored in the hood of each door.)

A rugged, all-metal curtain protects each opening when the Kinnear Rolling Door is closed — a positive barrier to trespassers, vandals, wind, and weather, *plus added protection against fire.*

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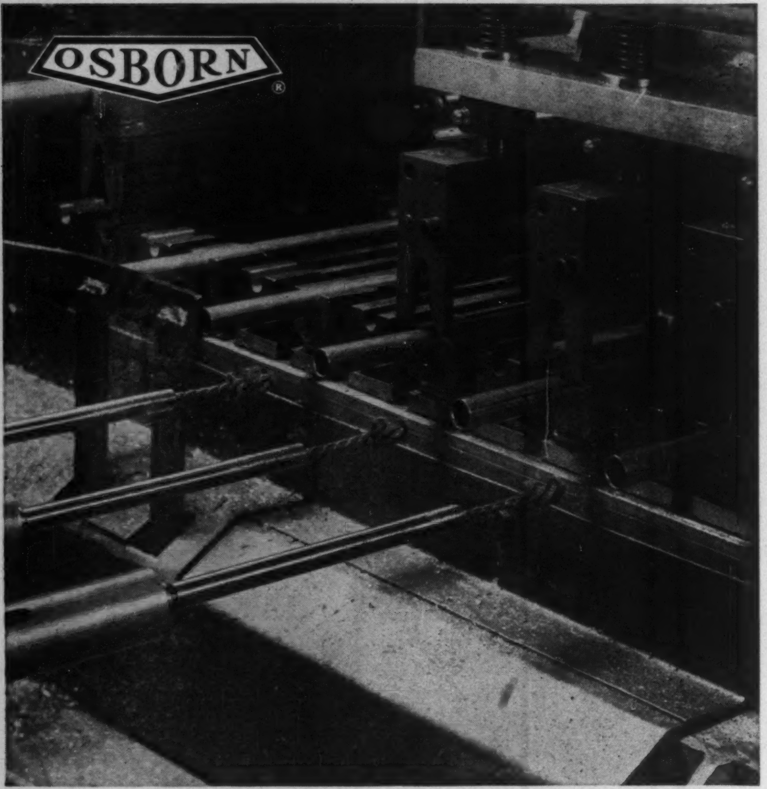
Saving Ways in Doorways



AUTOMATIC POWER BRUSHING SETUP cleans inside surfaces of steel tube components. Conveyor stops for every three tubes while three Osborn Helituf® brushes (operating at 380 rpm) advance through more than half the tube length. As they withdraw, three more brushes enter from the opposite end to complete the operation. Tube interiors are power brushed clean . . . all burrs removed. Rate: 750 pieces per hour.

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Metal Finishing Machines . . . and Finishing Methods
Power, Paint and Maintenance Brushes • Foundry Production Machinery

EXHIBITORS

NONFERROUS METALS

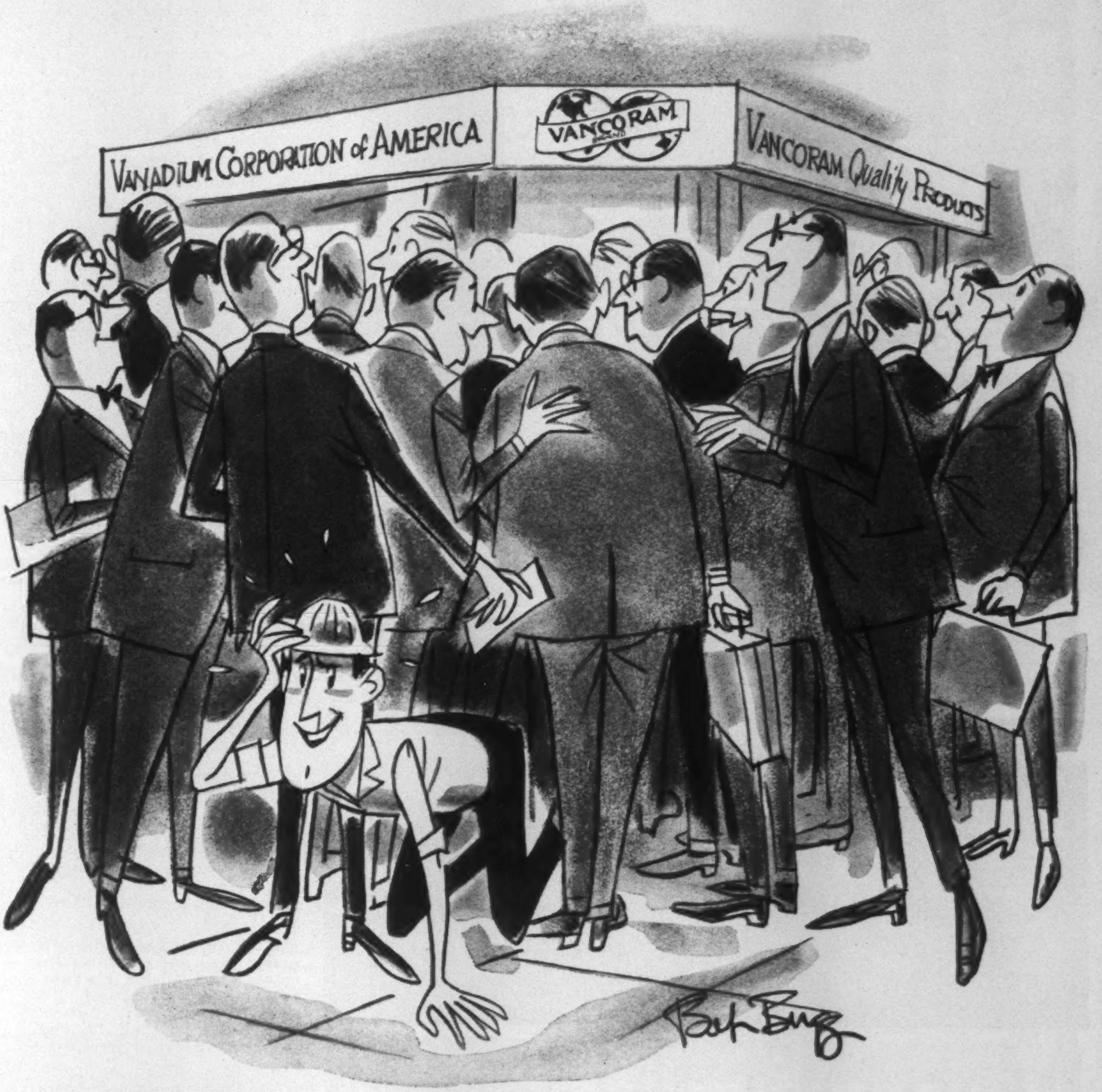
Exhibitor	Booth
Al-Fin Corp.	1855
Aluminum Co. of America	1410
Beryllium Corp.	1319
J. Bishop & Co., Platinum Works	1829
Brooklyn Steel Warehouse Co.	1870
Brush Beryllium Co.	718
Canada—Dept. of Trade & Commerce	1510
Cobalt Information Center	631
Cooper Metallurgical Assoc.	1864
Crucible Steel Co. of America	346
Haynes-Stellite Co. Div., Union Carbide Corp.	1032
International Nickel Co., Inc.	122
Janney Cylinder Co.	1453
Kawecki Chemical Co.	1350
Kester Solder Co.	1954
National-Standard Co.	1377
Republic Steel Corp.	214
Tin Research Institute, Inc.	627
Union Carbide Metals Co. Div., Union Carbide Corp.	1032
Westinghouse Electric Corp.	702

RELATED ENGINEERING MATERIALS

Exhibitor	Booth
Al-Fin Corp.	1855
Aluminum Co. of America	1410
Amersil Quartz Div. Engelhard Industries, Inc.	1839
Beemer Engineering Co.	1929
H. B. Fuller Co.	1273
Gries Reproducer Corp.	1211
Laboratory Equipment Corp.	1967
National Carbon Co. Div., Union Carbide Corp.	1032
National-Standard Co.	1377
Polymer Corp.	508
Steco Corp.	1342
Tempil Corp.	1327
Union Carbide Corp.	1032
Van der Horst Corp. of America	1868

NUCLEAR MATERIALS

Exhibitor	Booth
Allegheny Ludlum Steel Corp.	114
American Machine & Metals, Inc. Riehle Testing Machines Div.	1909
Arcweld Mfg. Co.	1818
Babcock & Wilcox Co. Tubular Products Div.	312
J. Bishop & Co.—Platinum Works	1829
The Carpenter Steel Co.	222
Cincinnati Sub-Zero Products	1959
Cooper Metallurgical Assoc.	1864
Crucible Steel Co. of America	346



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There are other good reasons for being there, too. VCA is *always* headquarters for the latest information on ferroalloy developments and applications. It is the place to go for the most complete line of quality ferroalloys . . . for experienced advice and counsel on alloying problems . . . for prompt service and highly efficient technical cooperation. As a leader in the field, with its modern research and production facilities, VCA is in fact your best source of progress and improvement in steel through ferroalloys.

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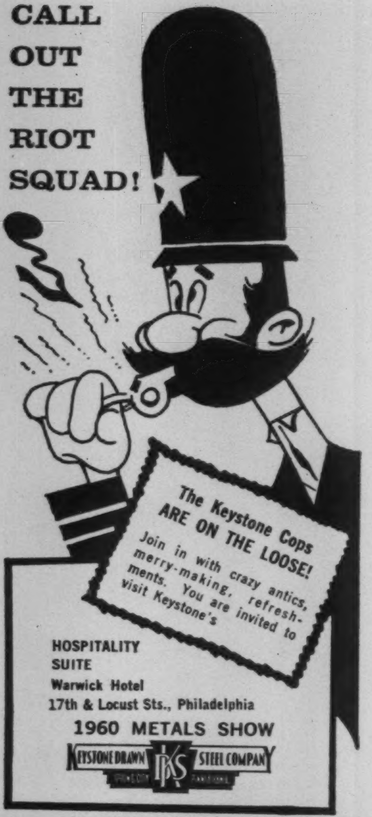
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1960 METALS SHOW

KEYSTONE DRAWN STEEL COMPANY

EXHIBITORS

Exhibitor	Booth
Harper Elect. Furnace Corp.	1857
Instron Engineering Corp.	808
International Nickel Co. Inc.	122
National Carbon Co. Div., Union Carbide Corp.	1032
Radionics, Inc.	1539
Tempil Corp.	1327
Universal Cyclops Steel Co.	305
Van der Horst Corp. of America	1868

TOOL MATERIALS, CUTTING OFF AND FORMING

Exhibitor	Booth
Allegheny Ludlum Steel Corp.	114
Allison-Campbell Div. American Chain & Cable Co., Inc.	1466
Antares Instruments, Inc.	1758
American Pullmax Co., Inc.	1756
Balcrank, Inc.	1266
Barer Engineering & Machinery Co., Ltd.	1668
Braeburn Alloy Steel Corp.	203
Canada—Dept. of Trade & Commerce	1510
The Carpenter Steel Co.	222
Cobalt Information Center	631
Crucible Steel Co. of America	346
Dayton Perforators, Inc.	915
Henry Disston Div. H. K. Porter Co. Inc.	1950
Joseph Dixon Crucible Co.	1858
Firth Sterling Inc.	103
Gulf Oil Corp.	1523
E. G. Heller's Son, Inc.	1760
E. F. Houghton & Co.	709
Latrobe Steel Co.	119
Marquardt Corp.	1672
James H. Matthews Co.	1027
Merrill Brothers	1372
Oliver Machinery Co.	1355
Portomag Inc.	1963
Raytheon Co.	1277
Relton Corp.	1861
Shell Oil Co.	1550
Sieburg Industries Inc.	1869
Texaco, Inc.	803
Universal-Cyclops Steel Corp.	305
Vanadium-Alloys Steel Co.	320
Wales-Strippit Inc.	1658
Wells Mfg. Corp.	1339

INDUSTRIAL HEATING

Exhibitor	Booth
Aerobraze Corp.	1274
Ajax Electric Co., Inc.	717
Ajax Magnethermic Corp.	1810
American Gas Association	1910
American Gas Furnace Co.	1910-B
Arcweld Mfg. Co.	1818

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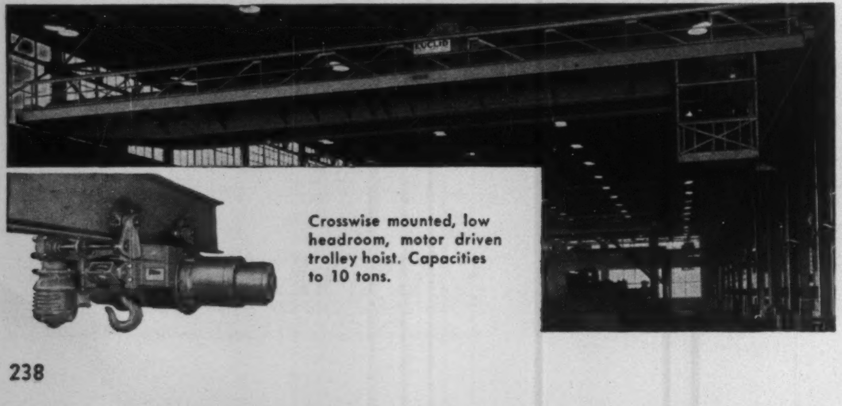
can be vastly improved with EUCLID CRANES



Crosswise mounted, low headroom, motor driven trolley hoist. Capacities to 10 tons.

Warehouse operational efficiency is contingent in no small way upon material handling efficiency.

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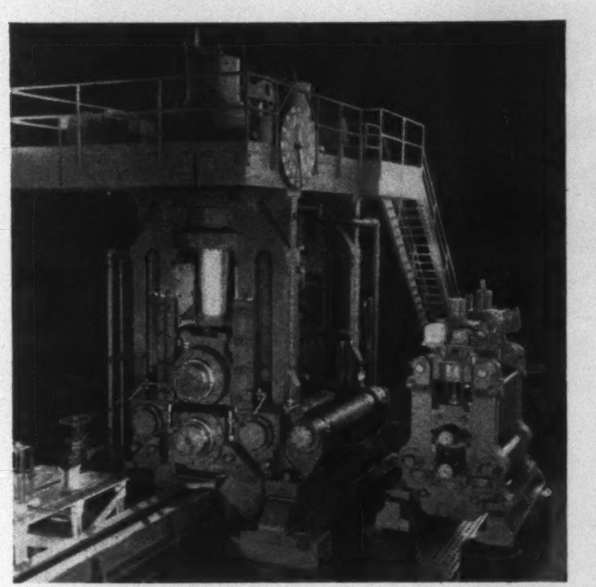
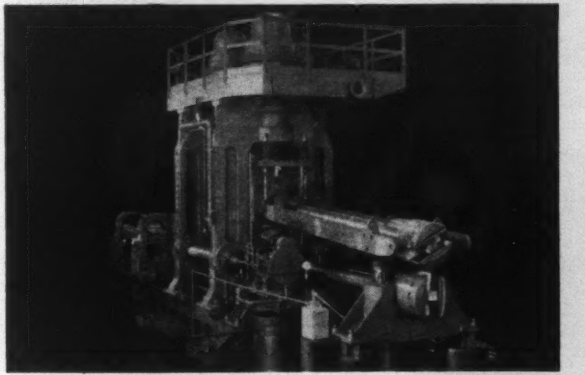
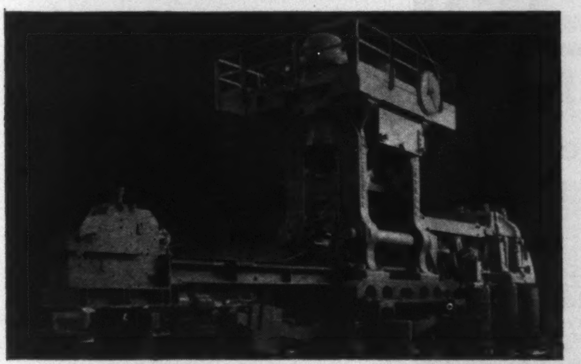


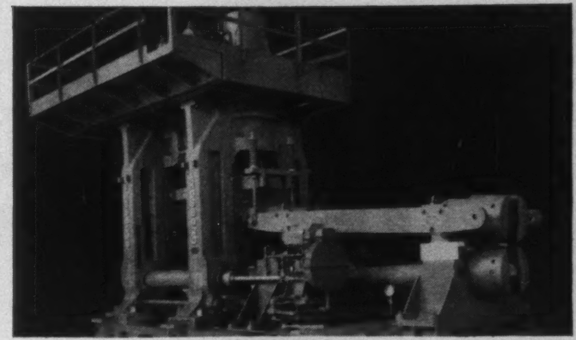
36″ x 78″ 2-High Reversing Billet and Slab Mill equipped with anti-friction bearings, hydraulic roll balance and a single roll changing rig. An 18″ Billet and Slab Mill is shown for comparison. This mill has water lubricated bearings and tilting cap housings.



28″ x 70″ 2-High Reversing Blooming Mill equipped with water lubricated bearings, counterweight roll balance, feed rolls and a duplex roll changing rig.

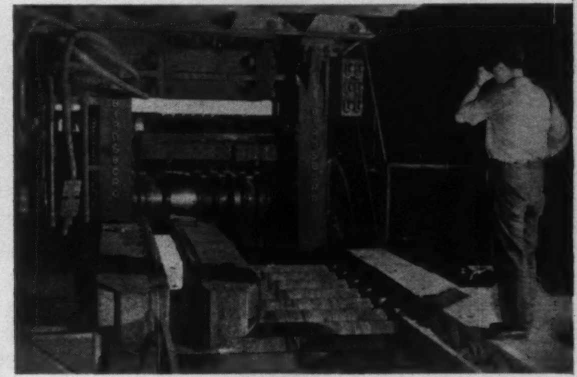


22″ x 66″ 2-High Reversing Blooming Mill equipped with water lubricated bearings, counterweight roll balance, feed rolls, and a crane operated single roll changing rig.



32″ x 78″ 2-High Reversing Blooming Mill equipped with water lubricated bearings, counterweight roll balance, feed rolls, and a duplex roll changing rig.

26″ x 66″ 2-High Reversing Billet Mill equipped with water lubricated bearings, counterweight roll balance, feed rolls, and a duplex roll changing rig.



20″ x 60″ 2-High Reversing Billet Mill shown in operation. This mill has water lubricated bearings, counterweight roll balance, and a duplex roll changing rig.

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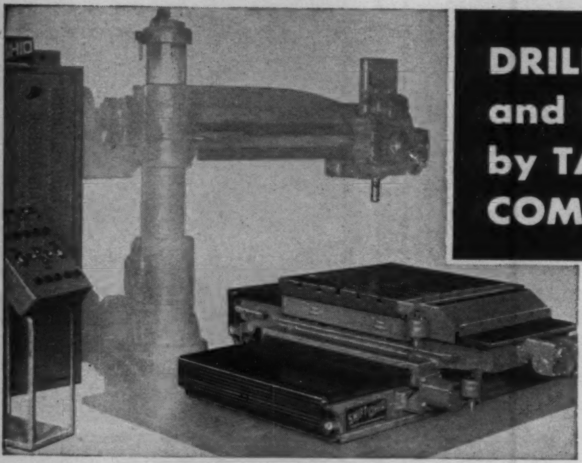

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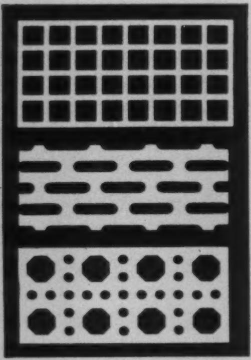

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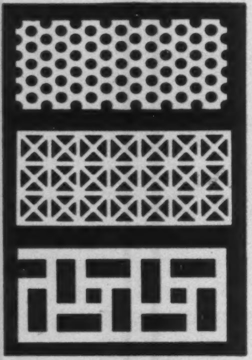

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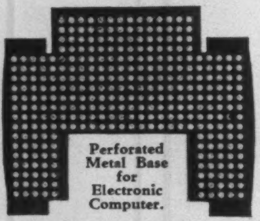

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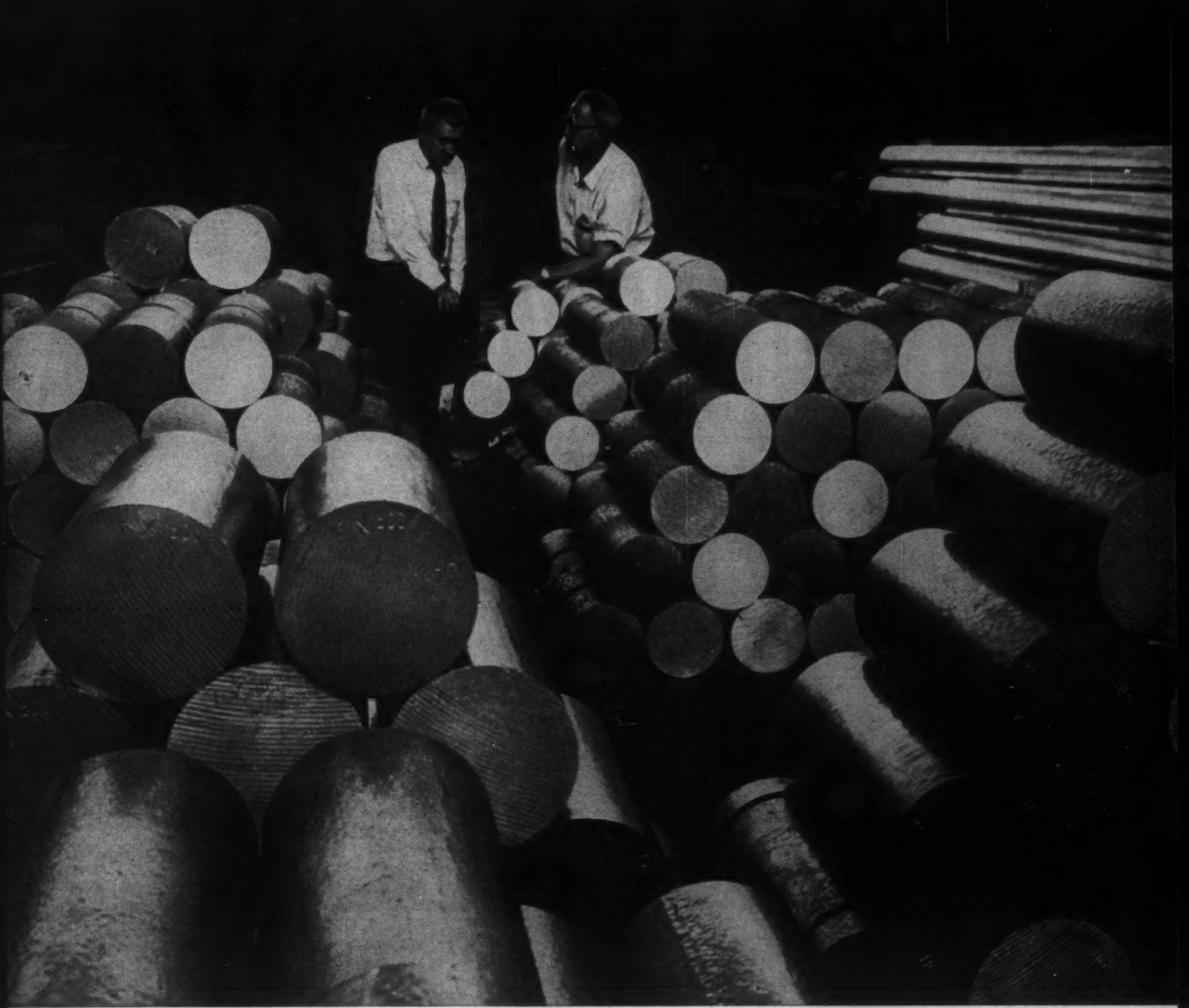
EXHIBITORS

Exhibitor	Booth
Audubon Metalwove Belt Div.	617
Barber-Colman Co. Wheelco Instruments Div.	1921
E. W. Bliss Co.	1564
Consolidated Vacuum Co.	1219
Day Engineering, Inc.	1710
Joseph Dixon Crucible Co.	1858
Dry Clime Lamp Corp.	1571
Electric Furnace Co.	1341
Electric Hotpack Co., Inc.	1250
Electrohome Technical Products Div.	1817
Engelhard Industries, Inc.	1834
Gas Appliance Service Inc.	1910-F
General Alloys Co.	930
General Electric Co. Industrial Heating Dept.	1610
Gulf Oil Corp.	1523
William J. Hacker & Co., Inc.	1449
Hamler Industries, Inc.	1568
Harper Electric Furnace Corp.	1857
Harris-Refrigeration Co.	1326
C. I. Hayes, Inc.	1454
Hevi-Duty Electric Co. Como Cast Div.	501
High Vacuum Equipment Corp.	1417
Holcroft & Co.	704
Charles A. Hones, Inc.	1910-O
E. F. Houghton & Co.	709
Illinois Testing Labs., Inc.	1457
Ionic Electrostatic Corp.	1972
Ipsen Industries, Inc.	1601
Johnson Gas Appliance Co.	1956
Kinney Mfg., Div., New York Air Brake Co.	1471
Laboratory Equipment Co.	1967
Leeds & Northrup Co.	1315
Lepel High Frequency Labs., Inc.	1228
Lindberg Engineering Co.	624
Metlab Co.	1842
NRC Equipment Corp.	1301
Ohio Crankshaft Co., Tocco Div.	1757
Park Chemical Co.	1850
Perfection Industries Div. of Hupp Corp.	1910-C
Philco Corp., Lansdale Div.	1549
Radio Frequency Co., Inc.	1851
Rolock, Inc.	1809
J. O. Ross Engineering Corp.	1540
Scientific Electric, Inc.	1972
Selas Corp. of America	1910-A
Shampaine Scientific Co. Div., Shampaine Industries	1866
Spencer Turbine Co.	1910-E
F. J. Stokes Corp.	1625
Surface Combustion Div., Midland-Ross Corp.	1540
Tempil Corp.	1327
Texaco, Inc.	803
Waukee Engineering Co.	1227
Edwin L. Wiegand Co.	1363
West Instrument Corp.	1461
Westinghouse Electric Corp.	702

CLEANING AND FINISHING

Exhibitor	Booth
Allison-Campbell Div. American-Chain & Cable Co., Inc.	1466
Balcrank Inc.	1266



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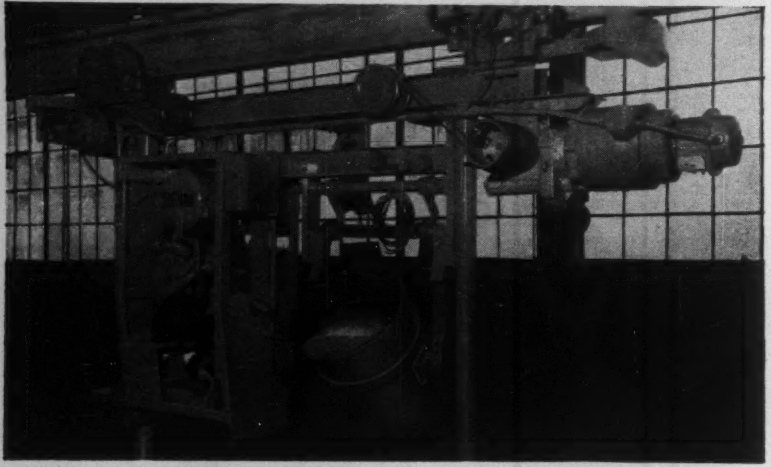
Apex Smelting Company, Chicago, Cleveland, Los Angeles
Aluminum Inc., Fort Lauderdale, Florida

SHEPARD NILES

HOT METAL CARRIER

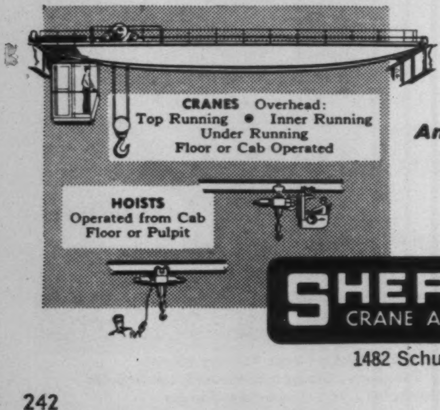
MOVE HOT METAL

the safe, swift, economical way



Shepard Niles hot metal carriers efficiently move molten metal safely and swiftly from cupola to pouring line. These rugged, modern carriers cut handling costs and save manpower by enabling ONE man to transport and pour molten metal. You can be certain of fast precision pouring because the operator cab is on the same level as the hot metal being poured.

Mechanize your foundry for labor-saving, low cost handling of molten metal. Send for the Hot Metal Carrier bulletin . . . or ask that a Shepard Niles representative call — there's NO OBLIGATION.



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EXHIBITORS

Exhibitor	Booth
Binks Mfg. Co.	515
G. S. Blakeslee & Co.	1401
Branson Ultrasonic Corp.	1539
Circo Equipment Co.	1654
Columbus Coated Fabrics Corp.	926
Corrosion Reaction Consultants, Inc.	1933
Detrex Chemical Industries Inc.	1205
Joseph Dixon Crucible Co.	1858
Dow Chemical Co.	1519
Eclipse Air Brush Co.	1702
E. I. du Pont de Nemours & Co.	1405
Engelhard Industries	1839
General American Trans. Corp. Kanigen Div.	1336
G. S. Equipment Co.	512
Harris Transducer Corp. Ultrasonic Div.	1620
Harshaw Chemical Co.	828
E. F. Houghton & Co.	709
Ionic Electrostatic Corp.	1972
Kawecki Chemical Co.	1350
Kolene Corp.	1251
Lake Chemical Co.	1450
Manpro Corp.	925
Metal Finishers, Inc.	1862
Minnesota Mining & Mfg. Co.	1467
Samuel Moore & Co., Synflex Products Div.	1750
National Ultrasonic Corp.	1969
Nordson Corp.	1309
Oakite Products, Inc.	1427
Pangborn Corp.	931
Pennsalt Chemicals Corp.	1556
Philco Corp., Lansdale Div.	1549
Phillips Mfg. Co.	518
Powertron Ultrasonics Corp.	1867
Radio Frequency Co., Inc.	1851
Ransburg Electro-Coating Corp.	1483
Service Hard Chromium Co.	1362
Spee-Flo Co.	1361
Syntron Co.	1825
Turco Products, Inc.	1728
U. S. Electrical Motors, Inc.	1822
Ultrasonic Industries	1853
Van der Horst Corp. of America	1868
Waldron-Hartig Div. Midland-Ross Corp.	1540
Waukee Engineering Co. Inc.	1227
Westinghouse Electric Corp.	702
Edwin L. Wiegand Co.	1363
Wyandotte Chemicals Corp.	1772

WELDING AND JOINING

Exhibitor	Booth
Aerobraze Corp.	1274
Ajax Magnethermic Corp.	1810
American Gas Association	1910
American Gas Furnace Co.	1910-B
Banner Welder, Inc.	1701
Bren Weld Corp.	1257
H. B. Fuller Co.	1273
Guthery Machine Tool Corp. Aro Spot Welder Div.	1368

Exhibitor	Booth
High Vacuum Equipment Corp.	1417
Hobart Bros. Co.	1636
KSM Products, Inc.	1716
Lepel High Frequency Labs., Inc.	1228
Lindberg Engineering Co.	624
Materials Research Corp.	835
Parker-Kalon Div., General American Trans. Corp.	1338
Raytheon Corp.	1277
Relton Corp.	1861
Selas Corp. of America	1910-A
A. O. Smith Corp.	1650
South Chester Corp., Southco Div.	836
Star Expansion Ind. Corp.	1354
Edwin B. Stimpson Co., Inc.	605
Westinghouse Electric Co.	702

TESTING, INSPECTION, CONTROL AND RESEARCH

Exhibitor	Booth
American Cystoscope Makers, Inc.	1854
American Machine & Metals Inc. Riehle Testing Machine Div.	1909
American Optical Co. Instrument Div.	805
Arcweld Mfg. Co.	1818
Balteau Electric Corp.	817
Barber-Colman Co. Wheelco Instruments Div.	1921
Bausch & Lomb Optical Co.	1419
Budd Co.	1420
Buehler Ltd.	816
Collins Microflat Co.	1665
Compudyne Corp.	1960
Cooke, Troughton & Simms, Inc.	706
Curtiss-Wright Corp. Princeton Div.	1801
Daystrom Inc. Weston Instruments Div.	1577
Detroit Testing Machine Co.	1946
Eastman Kodak Co.	1727
Edmund Scientific Corp.	1771
Elion Ultrasonics, Inc.	1630
Engelhard Industries, Inc.	1839
Gries Industries, Inc.	1215
William J. Hacker & Co., Inc.	1449
Harshaw Scientific Div. of Harshaw Chemical Co.	828
Hastings-Raydist, Inc.	1971
High Vacuum Equipment Corp.	1417
Howe Sound Co.	1657
Illinois Testing Labs., Inc.	1457
Instron Engineering Corp.	808
Instrument Development Labs., Inc.	1764
Ipsen Industries, Inc.	1601
King Tester Corp.	832
Laboratory Equipment Corp.	1967
Leeds & Northrup Co.	1315
E. Leitz, Inc.	1278
Lindberg Engineering Co.	624
Magnaflux Corp.	1520
Magnetic Analysis Corp.	1560
Mahr Gage Co., Inc.	732
Markal Co.	1450
Materials Research Corp.	835
Mine Safety Appliances Co.	1767
Minneapolis-Honeywell Co.	1458
Newage Industries, Inc.	1275
Philco Corp., Lansdale Div.	1549

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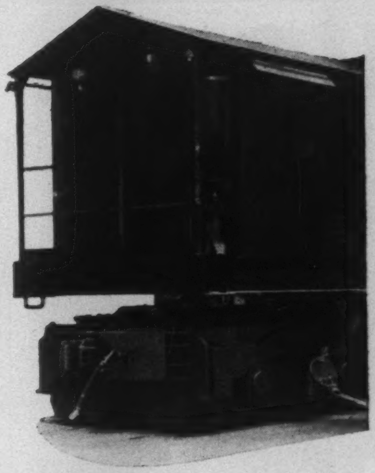

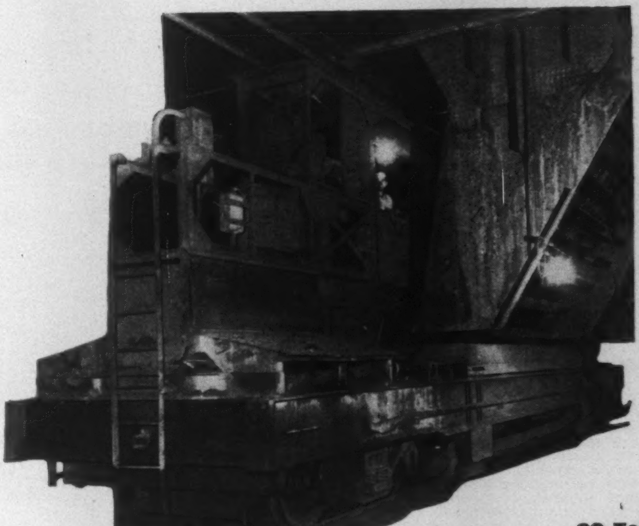

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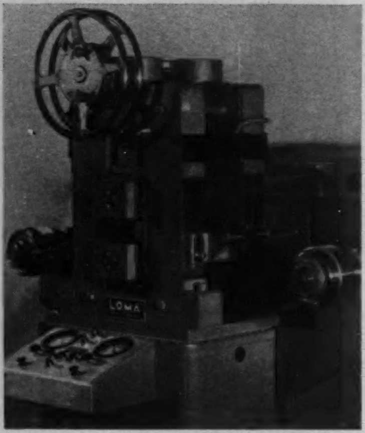
NEWS FROM

LOMA



This rugged and versatile reversing 2-high / 4-high combination mill brings high-precision rolling of thin-gauge ferrous and non-ferrous strip within reach of the smaller re-rolling mill, metals pilot plant and research laboratory. Occupying only 35 sq. ft. of floor space and involving a cost of less than $20,000, the machine handles up to 6 in. wide strip at rolling speeds up to 250 ft. per min. with accurate front and back tension control.

The new 8 in. mill is furnished with two sizes of 4-high work rolls, made of either alloy tool steel or solid tungsten carbide: the 1½ in. size is used for normal cold reduction down to 0.002 in. thickness, and the ¾ in. size allows special ultra-thin finishing to gauges of less than 0.001 in. In the 4-high setup, the machine handles up to ⅛ in. gauge; the 2-high arrangement is used for the hot or cold breakdown of heavier materials up to 1 in. thick, but is also available for skin pass rolling of thin strip.

The production of close-tolerance stock is assured by an exceptionally rugged mill design, employing steel housings of 160 sq. in. post area, super-precision needle roller journal bearings of 175,000 lb. separating force capacity, a heavy-duty mill drive with herringbone gearing and universal joint spindles, and twin-handwheel worm drive screwdowns. The machine is powered by a four-speed reversing drive offering constant horsepower from 40 to 250 ft. per min. rolling speed.

The outstanding feature of the new machine is its reversing strip coiling attachment allowing the two-way rolling of strip under tension control with no more effort than a mere flick of a selector switch. Mounted on brackets at either side of the mill, the two coiling shafts carry 8 in. diameter reels designed for a coil buildup of 6 in. Both shafts are driven from the pinion stand and are provided with dual air-operated slip clutches and brakes of ultra-sensitive, low-inertia design. Selective operation through solenoid valves and pressure regulators precisely controls the front and back tensions desired for any given mill pass.

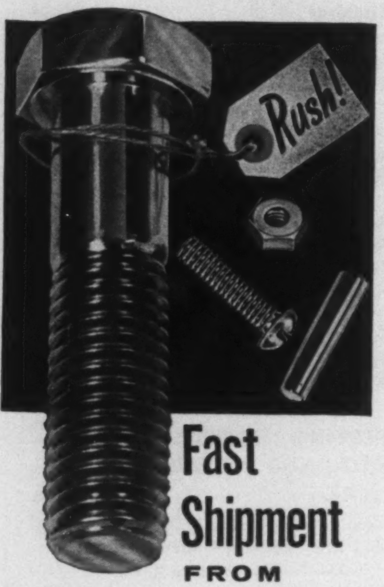
LOMA
MACHINE MFG. CO., INC.
114 East 32nd Street
New York 16, N. Y.

EXHIBITORS

Exhibitor	Booth
Picker X-Ray Corp.	1561
Pyrometer Instrument Co.	1742
Radiation Electronics Co. Div. of Comptometer Corp.	1553
Radionics, Inc.	1539
Riehle Testing Machines Div. American Machine & Metals Inc.	1909
Scherr-Tumico Co.	1240
Shaw Instruments Corp.	1871
Sperry Products Co.	724
Steel City Testing Machines Inc.	1746
F. J. Stokes Corp.	1625
Syntron Co.	1825
Tempil Corp.	1327
Tinius Olsen Testing Machine Co.	1720
Torsion Balance Co.	1533
Turco Products Corp.	1728
United Scientific Co. Unitron Instrument Div.	1439
West Instrument Corp.	1461
Wilson Mechanical Instrument Div., American Chain & Cable Co., Inc.	1330

PRODUCTION AND CASTING

Exhibitor	Booth
Ajax Electric Co.	717
Ajax Magnethermic Corp.	1810
Aluminum Co. of America	1410
American Gas Association	1910
American Gas Furnace Co.	1910-B
Antares Instruments, Inc.	1758
E. W. Bliss Co.	1564
Consolidated Vacuum Corp.	1219
Joseph Dixon Crucible Co.	1858
Exomet, Inc.	1239
Hevi-Duty Electric Co.	501
Charles A. Hones, Inc.	1910-D
International Nickel Co.	122
Audubon Metalwove Belt Div. Manganese Steel Forge Co., Inc.	617
Martin Engineering Co.	1279
Materials Research Corp.	835
Merrill Bros.	1372
National Carbon Co. Div., Union Carbide Corp.	1032
Philco Corp. Lansdale Div.	1549
Spencer Turbine Co.	1910-E
F. J. Stokes Corp.	1625
Surface Combustion Div. Midland-Ross Corp.	1540
Tempil Corp.	1327
Union Carbide Corp.	1032
Union Carbide Metals Co., Div. Union Carbide Corp.	1032
Vanadium Corp. of America	204
Wai-Met Alloys Co.	1657



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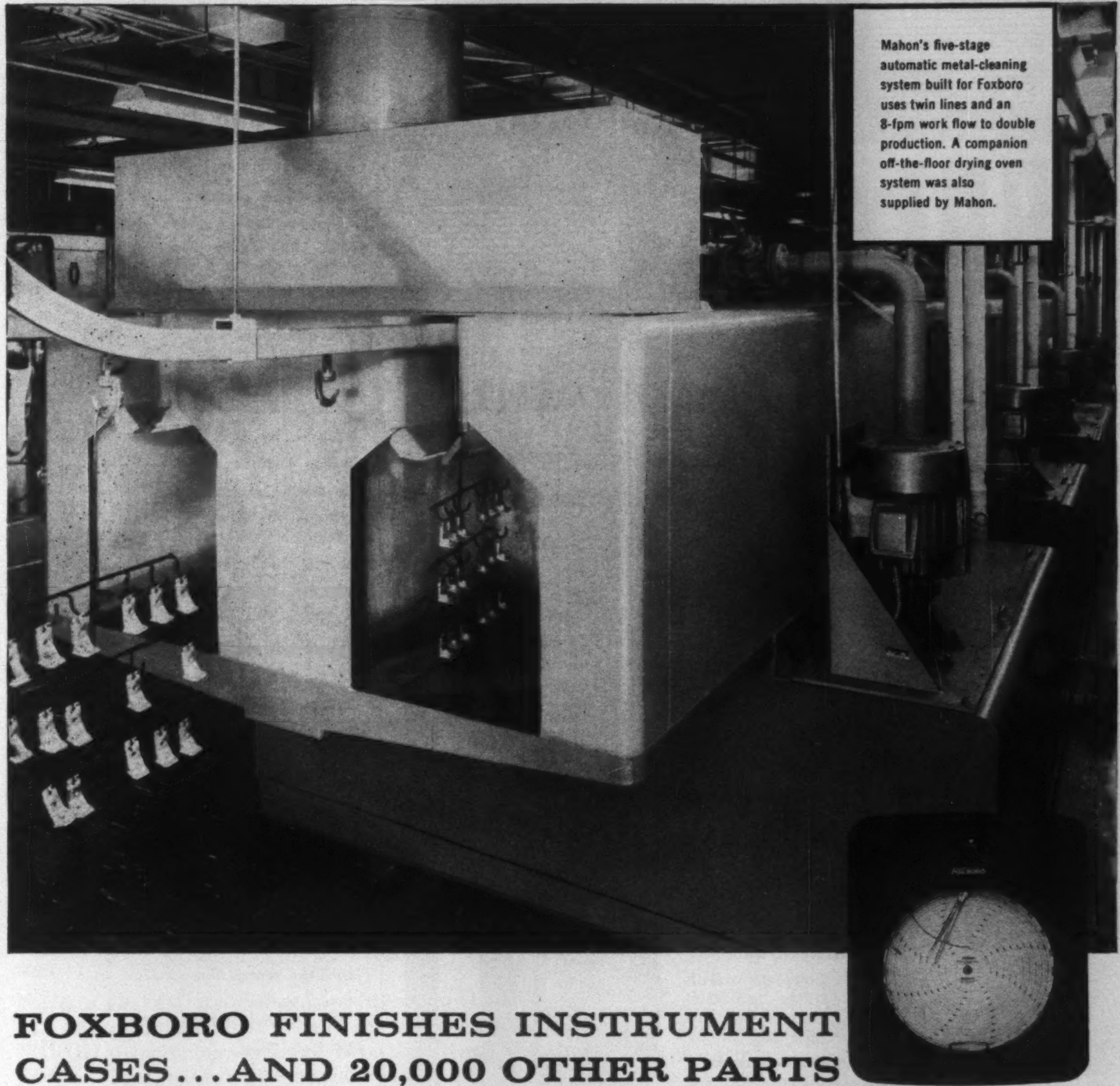

Mahon's five-stage automatic metal-cleaning system built for Foxboro uses twin lines and an 8-fpm work flow to double production. A companion off-the-floor drying oven system was also supplied by Mahon.

FOXBORO FINISHES INSTRUMENT CASES...AND 20,000 OTHER PARTS AS WELL...WITH MAHON EQUIPMENT

The Foxboro Company of Foxboro, Mass. is meeting the stepped-up industrial need for control and measuring instruments. Two new Mahon Finishing Systems and other allied equipment were recently installed to help solve Foxboro's accelerated production problems for these high-quality, high-precision products. The result: an automatic metal-cleaning process, flexible enough to handle some 20,000 parts—efficient enough to double capacity; and a space-conserving off-the-floor drying-oven system that integrates all priming and finish painting. The Mahon-engineered and built equipment not only met new production requirements under improved working conditions but also offered color flexibility (six of more than 150 colors can be run at one time).

Improved finishing is probably the *easiest . . . and most economical . . . product improvement* you can make. Call in a Mahon engineer and get the facts on what Mahon can do for your product . . . your costs.

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ROLOCK®

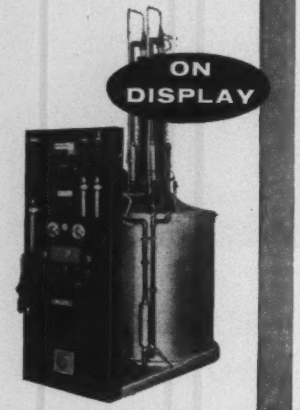
ATMOSPHERE EQUIPMENT

- ***NEWEST and most advanced engineering***
- ***important NEW aids to quality control***
- ***coordinated systems and equipment***

ROLOCK CARBON POTENTIAL CONTROLLER

- Accurately controls carbon potential of furnace atmospheres (not by dewpoint).
- Immediate and constant response.
- Precise and dependable control.
- Minimum maintenance.
- Specially trained operators not required.

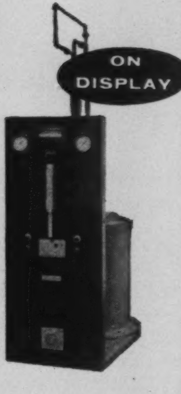
U.S. Patent No. 2,818,246 (Kappel)



ROLOCK ENDOTHERMIC GAS GENERATOR

- Complete reversibility and self-cleaning of catalyst beds.
- Precise gas-air metering and mixing.
- Dual Catalyst chambers... complete cracking.
- Triple cooling effect prevents reverse action.
- Compact, easily installed "packaged" unit.

U.S. Patent No. 2,802,725 (Kappel)



ROLOCK AMMONIA DISSOCIATOR

- Same high standards of efficiency and performance as the Endothermic Gas Generator.
- Addition of propane or natural gas adjusts gas levels for heat treating plain carbon or alloy steels.

For technical literature, write:
ROLOCK INC., 1362 KINGS HIGHWAY, FAIRFIELD, CONN.

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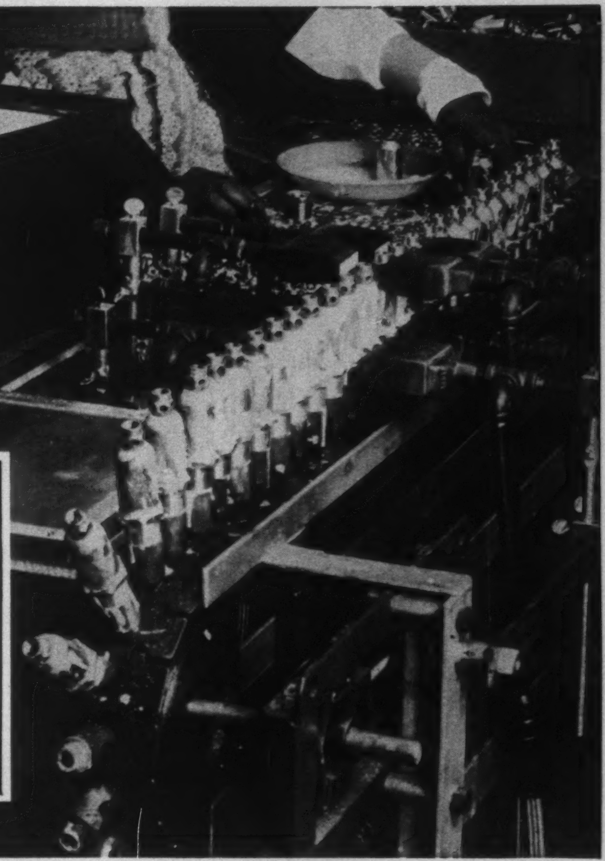
Easier Operation, Lower Cost

4RL60

EXHIBITORS

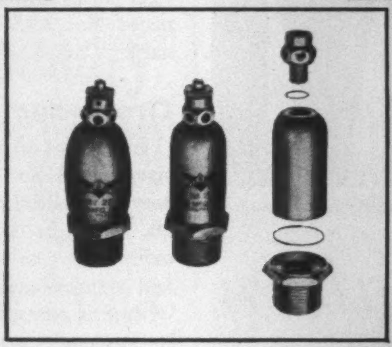
PARTS AND SHAPES FOR DESIGN AND APPLICATION

Exhibitor	Booth
Al-Fin Corp.	1855
Allegheny Ludlum Steel Corp.	114
Alloy Steel Casting Co. Div. of Fischer & Porter Co.	1470
Aluminum Co. of America	1410
American Brake Shoe Co. Electro-Alloys Div.	841
American Cast Iron Pipe Co.	1220
Babcock & Wilcox Co. Tubular Products Div.	312
Balcrank, Inc.	1266
Beemer Engineering Co.	1929
Beryllium Corp.	1319
J. Bishop & Co. Platinum Works	1829
Braeburn Alloy Steel Corp.	203
Brush Beryllium Co.	718
The Carpenter Steel Co.	222
Cobalt Information Center	631
Cooper Metallurgical Corp.	1864
Crucible Steel Co. of America	346
Joseph Dixon Crucible Co.	1858
Dodge Steel Co.	1740
Wilbur B. Driver Co.	1567
Enamelstrip Div. National Steel Corp.	246
Engelhard Industries, Inc.	1839
Engineered Precision Casting Co.	1269
General Alloys Co.	930
Gries Reproducer Corp.	1211
Hamilton Watch Co.	1267
Haynes-Stellite Co. Div., Union Carbide Corp.	1032
Heli-Coil Corp.	1316
Hitchiner Mfg. Co., Inc.	1768
Howe Sound Co.	1657
International Nickel Co., Inc.	122
Janney Cylinder Co.	1453
Latrobe Steel Co.	119
Samuel Moore & Co. Synflex Products Div.	1750
National Carbon Co. Div., Union Carbide Corp.	1032
National Steel Corp.	246
New Hermes Engraving Machine Corp.	1762
Republic Steel Corp.	214
Rolock, Inc.	1809
A. O. Smith Corp.	1650
Timken Roller Bearing Co. Steel & Tube Div.	129
Universal-Cyclops Steel Corp.	305
Vanadium-Alloys Steel Co.	320



Operator dips parts in HANDY FLUX and assembles them with EASY-FLO 45 rings on a moving rig. Assemblies then pass between banks of gas burners to complete brazing process. Capillary action of EASY-FLO brazing alloy insures thorough penetration—guarantees high strength, leakproof joints.

Flair No. 21 Hot Water Air Vent consists of the basic free-venting air valve, a generous air-collection chamber and a massive hex base. Two preform rings of EASY-FLO 45 are used in the brazing operation. Valve assembly at left was subjected to extreme pressure. Note how body ballooned; joints strong and leaktight.

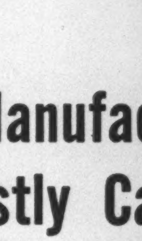


How Flair Manufacturing Speeds Production, Eliminates Costly Casting With Easy-Flo Brazing

Never a field failure in any joint brazed with EASY-FLO 45 and HANDY FLUX—that's the proud record of Flair Manufacturing Company, Brooklyn, New York, makers of an extensive line of air valves and other specialties for steam and hot-water systems.

Flair finds that brazing with EASY-FLO 45 offers competitive advantages in every aspect of design, production economy and service life. Big savings are made through elimination of costly casting equipment and more productive use of space. Production is smoother, faster. Valves look better, last longer... in tests to 5000 psi, valve bodies burst while brazed joints remain intact. All this for an alloy cost per unit of approximately 2½¢ for two preform rings of EASY-FLO 45.

Speed, strength, economy, low labor costs—advantages *any* manufacturer would be glad to have. And, all achieved through use of Handy & Harman silver alloy brazing. Chances are silver alloy brazing could benefit your product too. If it could, or if you think it *might*, don't hesitate to get in touch with Handy & Harman. We'll help you in every way possible. Why not call us today?



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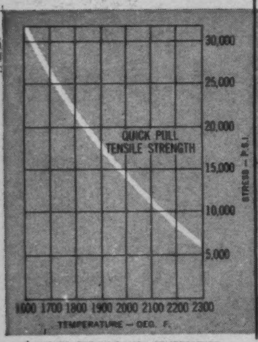
DURALOY HOM*

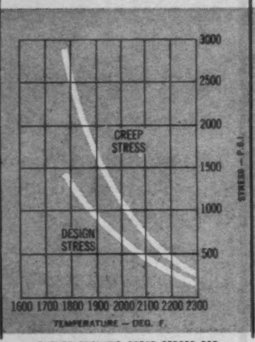
*Covered by U.S. Patents

casting alloy

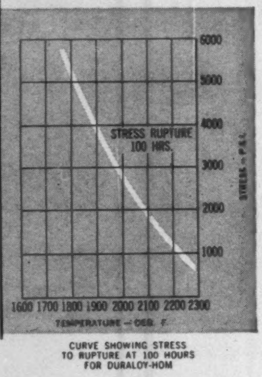
Duraloy "HOM" is a special high nickel alloy developed to produce castings that meet high temperature requirements, especially when castings are subject to oxidizing atmospheres.



CURVES SHOWING HIGH TEMPERATURE SHORT-TIME TENSILE STRENGTH OF DURALOY-HOM



CURVES SHOWING CREEP STRESS FOR CREEP RATE OF 1% IN 10,000 HOURS AND RECOMMENDED DESIGN STRESS FOR DURALOY-HOM



CURVE SHOWING STRESS TO RUPTURE AT 100 HOURS FOR DURALOY-HOM

Castings of DURALOY "HOM" are now being produced by our three methods: static, centrifugal and shell molded. Write today for additional information on this versatile new alloy.

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EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
CHICAGO OFFICE: 332 South Michigan Avenue
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

PATENT REVIEW

New Patents In Metalworking

Carries Steel Strip

Carbon-faced conveyor roll for silicon steel strip, A. M. Tohir (assigned to U. S. Steel Corp., Pittsburgh), Aug. 23, 1960. Improved carbon-faced roll transports silicon steel strip through a heating furnace. No. 2,950,097.
nace.

Ore Reduction

Reduction of ore, P. S. Viles (assigned to Esso Research & Engineering Co., Elizabeth, N. J.), Sept. 20, 1960. In the reduction of iron oxide ores, a mixture of ground ore and carrier-supported cobalt molybdate is contacted with a normally gaseous hydrocarbon at 850-1600°F, under fluidizing conditions to reduce the ore to substantially pure iron. No. 2,953,450.

Refines Cast Iron

Method for top blowing pulverulent burnt lime and oxygen onto iron for refining same, M. Allard and L. Wahl (assigned to Institut de Recherches de la Siderurgie, Saint-Germain - en - Laye, France), Aug. 23, 1960. In the refining of cast iron or pig iron, the surface of the bath is blown with a jet of oxygen and pulverulent burnt lime. This accomplises simultaneous decarbonization and dephosphorization. No. 2,950,186.

Finds Strip Breakage

Strip breakage detecting apparatus for continuous strip furnace, W. G. Gibbs (assigned to U. S. Steel Corp., Pittsburgh), Sept. 13, 1960. Apparatus for detecting the occurrence and determining the location of strip breakage in a continuous furnace, and stopping the conveyor rolls. No. 2,952,451.

LIMA

How Ohio Steel Foundry saves time and money with versatile Lima truck crane

Magnet-equipped Lima Truck Crane breaking scrap at The Ohio Steel Foundry Company, Springfield, Ohio.

"I certainly am impressed with the versatility and performance of our Lima Truck Crane. It does so many things, and does them so well, that we do not require additional equipment for special tasks.

"We have magnet, hook and clamshell attachments, permitting us to handle scrap metal, sand, coal, foundry flasks, and alloy metals. We also use the crane for plant maintenance, handling heavy machinery, and moving railroad cars about the plant. Air controls make this machine easy to operate with precision. Distributor service is excellent."—*says Maintenance Engineer, Carl D. Hoyt, The Ohio Steel Foundry Company, Springfield, Ohio.*

Learn all about money-saving, high-performance Limas. There's a type and size for every job requirement. Shovels to 8 yds.; crawler cranes to 140 tons, 80 tons on rubber; draglines variable. Choice of power. For facts and figures, get in touch with your nearest Lima distributor or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

New Lima 5-yd. Front Loader—economical way to handle bulk materials faster!

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WITH

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For increased production at reduced cost specify Berger quality tubing. Our complete engineering facilities can help you widen your design potential and produce a better product, at a better price. May we quote on your requirements?

There's a Berger Tube For Your Needs:

SIZE RANGE:
Round—¼" O.D. to 4" O.D.
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WALL THICKNESS:
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A wide range to meet your specific requirements.
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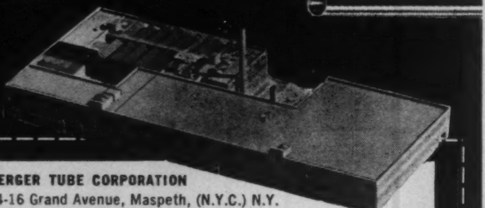
Beading, flaring, swaging, tapering and end forming.



BERGER TUBE CORPORATION
74-16 Grand Avenue, Maspeth, (N.Y.C.) N.Y.
DEfender 5-8000

☐ Send me your 8-page booklet on Tubing.
☐ Have your representative call

Name..Title..........................
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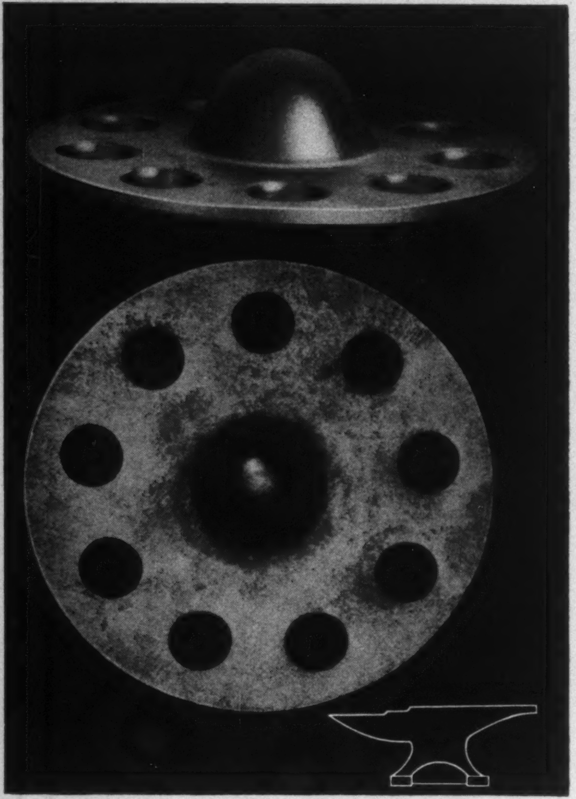
City.......................................Zone.........State.......................

RITCO FORGINGS



...their strength alone merits your design consideration!

Forged-in toughness which assures dependable impact resistance at points of greatest shock and stress is, in itself, a sound recommendation for the use of Ritco Forgings. Their dense, fibrous structure and controlled grain flow provide maximum fatigue strength . . . still another important factor in their favor. Combine these with close-tolerance accuracy and flawless finishes which speed up parts assembly and it's easy to see why Ritco Forgings are being written into more and more product designs. *All* things considered, it will pay you to write them into yours, too. Send us your blueprints for estimates at no obligation.

Ritco also offers complete machining facilities and makes Special Fasteners and Upsets of ferrous and non-ferrous metals. What are your requirements?

RHODE ISLAND TOOL COMPANY
Member Drop Forging Association
144 WEST RIVER STREET • PROVIDENCE 1, R. I.

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

Part Finishing

Consisting of four pages, a catalog describes a complete line of flat surface grinding and polishing machines for finishing and deburring parts. A complete list of specifications for each machine is included in a handy chart form. (Acme Mfg. Co.)

For free copy circle No. 1 on postcard

Industrial Diamonds

Laboratory activities, in improving and extending the applications for industrial diamonds, are reported in a brochure. The brochure also carries an extensive list of published papers on various aspects of diamond research. (Diamond Research Laboratory)

For free copy circle No. 2 on postcard

Metal-Industry Heaters

Plant heating problems in the metalworking industry, and the solutions offered by overhead recirculating heaters, fresh air supply heaters, and door heaters, are discussed in a four-page illustrated bulletin. (L. J. Wing Mfg. Co.)

For free copy circle No. 3 on postcard

Dial Spray Machine

A brochure on a high-production, automatic dial spray decorating machine, describes two machines for fast wiping of parts. (Conforming Matrix Corp.)

For free copy circle No. 4 on postcard

Lubricating System

Complete details on three types of a new automatic lubricating system are given in a bulletin. The system provides positive control of oil feed and circulation rates. The bulletin includes both photographs and engineering drawings to illustrate product data and specifications. (Bijur Lubricating Corp.)

For free copy circle No. 5 on postcard

Cuts Steel

Information on a device which cuts through ¼-in. cold or hot rolled steel is part of a data sheet. In addition, specifications of the device are included. (Fenway Machine Co., Inc.)

For free copy circle No. 6 on postcard

Instrumentation Tubing

The basic facts about all types of small diameter tubing, for instrument applications, are presented in one compact booklet. The 12-page bulletin is prepared specifically to help designers in their selection of instrument tubing. (Superior Tube Co.)

For free copy circle No. 7 on postcard

Industrial Insulation

Pertinent data concerning calcium silicate pipe and block insulation is contained in a six-page brochure. The multifold brochure lists heat transmission data, physical and thermal characteristics, standard sizes and recommended thicknesses. (Philip Carey Mfg. Co.)

For free copy circle No. 8 on postcard

Missile Program

Brand new is an up-to-date pictorial brochure of 14 pages, in full natural color, covering in detail the United States missile program. It also includes its research, space, test and special-purpose missiles. The book pictures missiles in use. (High Standard Mfg. Corp.)

For free copy circle No. 9 on postcard

Epoxy-Insulated Motors

Described in a bulletin are epoxy-insulated motors up to 500 hp, class B, 60°C rise, random wound in voltages to 600 and form wound in voltages to 4160. Detailed illustrations and cutaways of coil slots, stator and rotor laminations, fin-

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ished coils, the entire wound stator and the assembled core and frame show how the epoxy insulation completely fills slots and penetrates coils. (Elliott Co.)

For free copy circle No. 10 on postcard

Space Heaters

Direct-fired, oil-burning portable space heaters are covered in a catalog. Specifications and information on selecting the correct size heater are given on the five different sizes, ranging from 100,000-1,000,000 Btu/hour. Also illustrated are many uses for this versatile heater. (Stow Mfg. Co.)

For free copy circle No. 11 on postcard

Liquid Feeder

A bulletin provides recent information on a liquid feeder. The bulletin gives a detailed description of the feeder and its operation. It includes a list of typical materials handled. (B-I-F Industries)

For free copy circle No. 12 on postcard

Steel Selection

The job of selecting the right steel for machine parts for research and development is now much easier. Ideas for simplifying this problem are contained in a new folder. The folder explains how a high-strength and easy-to-machine all-purpose steel bar, can be readily used for making a wide variety of parts. (La Salle Steel Co.)

For free copy circle No. 13 on postcard

Copying Lathe

A foldout brochure covers several models of automatic, multicycling copying lathes. Specifications are also included. (Cone Automatic Machine Co., Inc.)

For free copy circle No. 14 on postcard

Platen Presses

Hydraulic platen presses are described in a catalog. The catalog includes specifications and descriptions of presses from 25-500 tons capacity. (Danly Machine Specialties, Inc.)

For free copy circle No. 15 on postcard

Handles Large Pieces

A two-page color bulletin illustrates and describes such semi-automatic conveyor features as: variable-speed drives, horizontal agitation, typical current carriers and drive mechanisms. The standard semi-automatic conveyor features heavy-duty carriers with self-lubricating collector fingers for large current loads. (Hanson - Van Winkle-Munning Co.)

For free copy circle No. 16 on postcard

Thermostats

A catalog covers all main types of bimetal thermostats in the manufacturer's line. The four-page catalog pictures each of the major thermostat groups. It gives technical, specification and performance data for both semi-enclosed and hermetically-sealed styles. (Stevens Mfg. Co., Inc.)

For free copy circle No. 17 on postcard

Cutting Tools

Special cutting tools are listed in an illustrated 45-page catalog. (F & D Tool Company, Inc.)

For free copy circle No. 18 on postcard

Turret Indexing Unit

An eight-page brochure describes the operating features of two series of turret indexing machine chassis. The illustrated booklet lists complete physical dimensions and specifications as well as available accessories. (Swanson-Erie Corp.)

For free copy circle No. 19 on postcard

Transfer Presses

An eight-page, illustrated brochure describes a complete line of transfer presses. The pamphlet describes in detail typical applications involving use of the machines for the high production of stamped and drawn parts. (The Baird Machine Co.)

For free copy circle No. 20 on postcard

Hydraulic Equipment

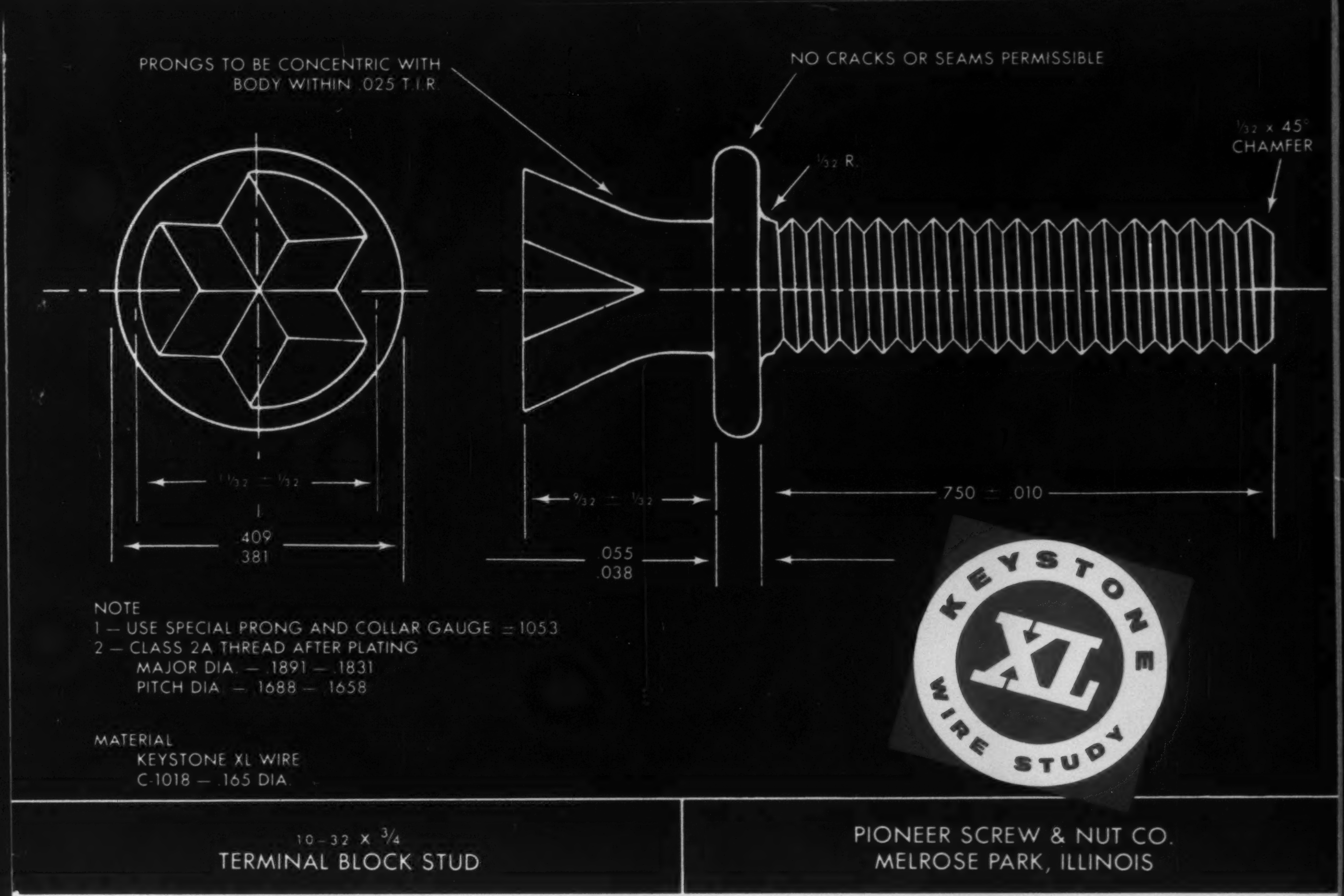
Eight informative pages of a catalog cover machine-tool and industrial hydraulics, including application recommendations. (John S. Barnes Corp.)

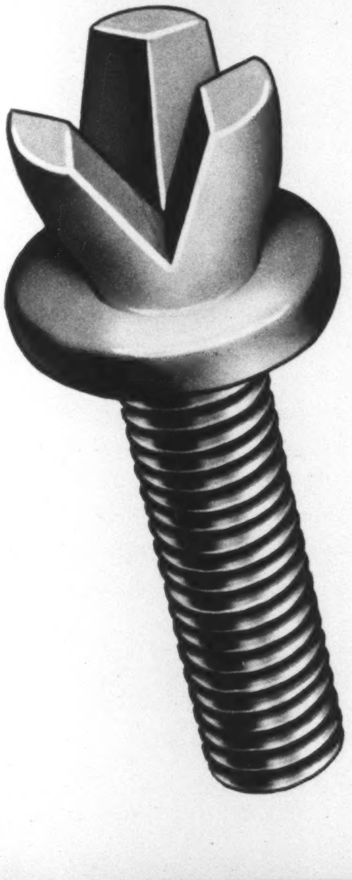
For free copy circle No. 21 on postcard

Refractories

Aluminum melting furnace brick and mortar is the subject matter of an eight-page technical publication. The literature outlines its characteristics and applications. The refractories are very much resistant to aluminum alloy attack. The brick and mortar are low in silica and high in alumina content. (Kaiser Refractories)

For free copy circle No. 22 on postcard


PRONGS TO BE CONCENTRIC WITH BODY WITHIN .025 T.I.R.
NO CRACKS OR SEAMS PERMISSIBLE
1/32 R.
1/32 x 45° CHAMFER
11/32 ± 1/32
.409
.381
9/32 ± 1/32
.055
.038
.750 ± .010
NOTE
1 — USE SPECIAL PRONG AND COLLAR GAUGE #1053
2 — CLASS 2A THREAD AFTER PLATING
MAJOR DIA. — .1891 — .1831
PITCH DIA. — .1688 — .1658
MATERIAL
KEYSTONE XL WIRE
C-1018 — .165 DIA.
KEYSTONE XL WIRE STUDY
10-32 x 3/4
TERMINAL BLOCK STUD
PIONEER SCREW & NUT CO.
MELROSE PARK, ILLINOIS



DIFFICULT — BUT SOLVED
BY PIONEER SCREW & NUT CO.
with KEYSTONE XL WIRE

Faced with a difficult heading problem, Pioneer Screw & Nut Co., Melrose Park, Illinois, uses Keystone XL .165″ Cold Heading Wire to upset, in a double blow, the terminal block stud illustrated here. This stud with its three prongs embedded into a plastic strip becomes an electrical terminal stud for such major heavy appliances as stoves, refrigerators, dryers, washers.

Specials from Pioneer Screw & Nut Co. require Keystone XL Wire when flowability for extreme shapes is required, such as this terminal block stud.

Says Robert A. Hirsch, President, "Pioneer's consistent high torque and quality requirements for our special screws are the reasons why we specify Keystone Wire. The end products result in better screws supplied to our customers."

Should you have wire forming problems, send us your blue prints and specifications. Our metallurgists will be pleased to analyze your wire requirements. Or call your nearest Keystone Wire Specialist; he is highly qualified to help you.

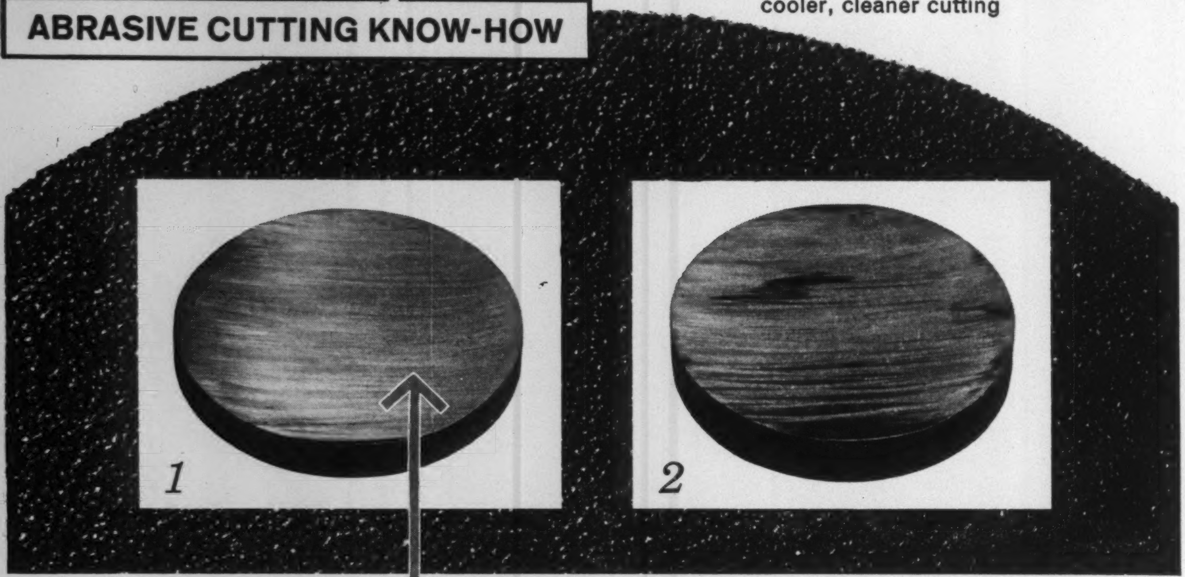
Keystone Steel & Wire Company, Peoria, Illinois

KEYSTONE
WIRE FOR INDUSTRY

Allison-Campbell

ABRASIVE CUTTING KNOW-HOW

Close-up view of resinoid wheel shows rough texture that provides cooler, cleaner cutting

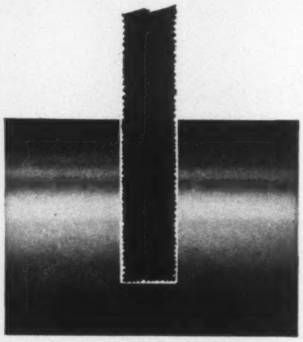


This CLEAN cut was made with a ROUGH-SIDED wheel!

1 • THE SPECIMEN ON THE LEFT ABOVE was cut from a 3¾" diameter hardened steel bar in just 28 seconds with an ALLISON *rough-sided* dry abrasive cutting wheel like the one shown in the background. Note that the cut is clean and practically burn-free.

2 • The specimen on the right was cut under the same conditions and with a wheel of the same formulation, but *without* rough sides. The result—the cut took 30 seconds and produced a badly burned surface.

3 • The secret is the extra clearance the rough sides give *inside* the cut (as shown in the small picture at right), and the resulting *cooler* cutting action. This adds to wheel life, too. That's why, for the dry abrasive cutting of solid bars, heavy-wall tubing and structural shapes, ALLISON-CAMPBELL field engineers generally recommend rough-sided wheels.



3 Inside the cut, rough-sided wheels give extra clearance, extra cooling for faster cutting and to prevent burning

For dry cutting of thin-wall tubing with minimum burr, a fine-grit, *smooth-sided* wheel is the choice. And for *wet* abrasive cutting, dozens of ALLISON wheel specifications are available to match the material you are cutting, the quality you require, and the cut-off machine you use.

Regardless of your cut-off problems, your ALLISON-CAMPBELL field engineer can help you choose the wheels that will give the results you want. He is an abrasive cutting specialist—use his know-how.

Write for **Bulletin DH-214A** *for details on the complete line of ALLISON wheels*

ACCO **ALLISON** ABRASIVE CUTTING **WHEELS**

Allison-Campbell Division • American Chain & Cable Company, Inc.

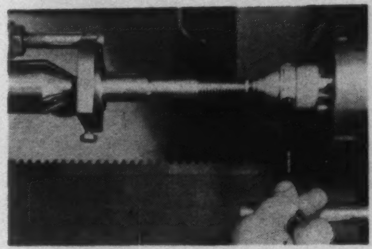
927 Connecticut Avenue, Bridgeport 2, Conn.

New Materials and Components

Adjustable Center Saves One Half the Setup Time

Trueing the work between centers of cylindrical grinders, is the first step to precision grinding. In many cases, much valuable time is lost by hit-or-miss table adjustments. An adjustable center permits quick, easy work alignment from the grinder tailstock or headstock. The device consists of an eccentrically ground sleeve and arbor. When assembled, they complement each other at "0" and embody a true center. (Enco Mfg. Co.)

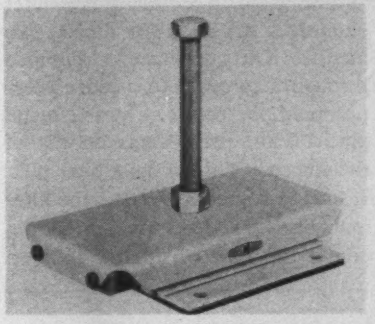
For more data circle No. 45 on postcard, p. 251



Mount Isolates Horizontal Motion of Machinery

Isolating shock and vibration, produced by machinery whose operation develops mostly horizontal forces, is the job of a machinery mount. Cold headers, shapers, diecasting machines, horizontal compressors, and others are types of machinery producing horizontal forces. Each mount will hande up to 4000-lb static load. One mount is used under each machine foot or support point. All are positioned for cushioning in the direction of horizontal forces. The equipment rests on a top plate. The plate rides on a set of internal rollers. End-positioned neoprene springs laterally restrain the plate. (Barry Controls)

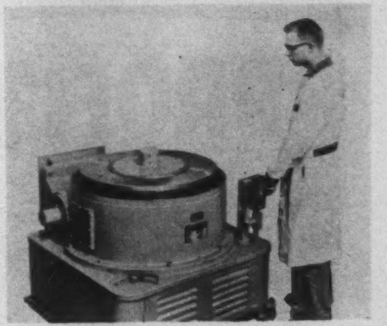
For more data circle No. 46 on postcard, p. 251



Cam Index Drive Has Open-Center Design

A cam index table drive indexes tables which will experience high thrust and/or radial loading conditions on trunnion and dial type automated machines. This also includes stationary center column machines and special machine tools. It has a follower plate thrust rating of over 31,000 lb; a tipping moment rating of 380,000 in.-lb. The follower plate of the cam index drive rides on an X-bearing. The bearing is mounted around the periphery of the follower plate. The X-bearing design takes loads in all directions. The periphery design of the X-bearing allows an open center in the index unit. (Expert Automation Machine Co.)

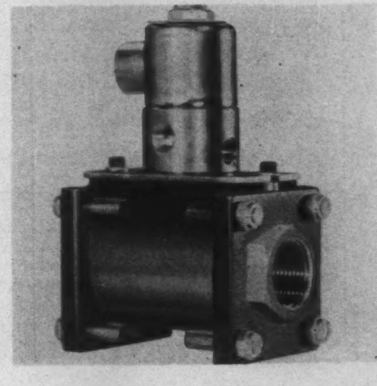
For more data circle No. 47 on postcard, p. 251



Valve Features Maintenance-Free Construction

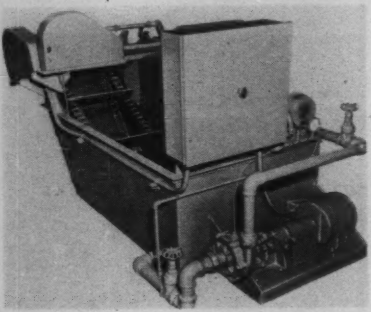
Without the use of poppets or spools, the squeeze action in a new valve automatically controls the flow of air, oil, chemicals and grinding slurries. There are no metal-to-metal contacts; no metal to rubber seals. This makes the valve particularly suitable for industries where contaminated fluids and gases present a problem. When the valve is open, supply pressure through the inlet port forces an elastic rubber sleeve against the tube. This forces the media to flow around the inlet plug and through the outlet port. To close the valve, pilot pressure is applied between the inside diameter of the tube and the outer periphery of the rubber sleeve. The valve handles pressures up to 200 psi. (Airmatic Valve, Inc.)

For more data circle No. 48 on postcard, p. 251



Suction Filter

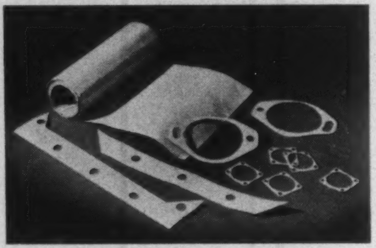
Self-cleaning, an automatic suction filter is used for all metal working, grinding and salvaging of coolant or waste material. The filter eliminates the need for replaceable media. Dirty coolant is pumped through a screen into a clean compartment for re-use. Swarf, metal particles or dirt collects on top of the screen. This forms a filter mat. It filters progressively. As the filter mat becomes deep enough to decrease the flow of filtered coolant, a switch is activated starting the conveyor. This moves the mat, restoring the flow of filtered coolant to normal rate. (Henry Mfg. Co.)



For more data circle No. 49 on postpaid, p. 251

Conductive Gasketing

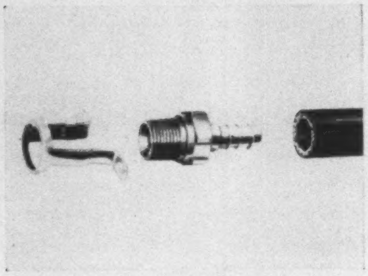
Specifically for high-temperature uses, a conductive gasketing conforms easily to irregular surfaces. The silicone rubber and metal material is impervious to fluids. The gasketing comes in two types—30 and 24 mesh aluminum alloy wire cloth impregnated with a 50 durometer silicone rubber to a thickness of 0.016 in. and 0.020 in. Silicone rubber conductive gasketing is recommended for use where a necessary conductive material is needed between two metal surfaces, to allow the flow of electrical current while restricting or filtering any induced radio frequency. (The Connecticut Hard Rubber Co.)



For more data circle No. 50 on postcard, p. 251

Hose Coupling

A hose nipple assembly may be used for hydraulic hose, double braid and single braid; also for steam hose and all types of hose which require a positive lock to the hose nipple. It is an all-purpose, re-usable hose nipple. It employs a specifically designed stem to minimize abrasion within the hose. The



EXECUTIVE REPORT #18

PROFITABLE FOR DEBURRING

Wherever machined parts are produced, burrs are a costly problem. And burr removal becomes excessively costly when hand labor is required. Wheelabrator *airless* blast deburring equipment, such as the table type illustrated, offers important advantages in cutting the cost of deburring. Its powerful media blast removes burrs uniformly, even from recessed areas, leaving an attractive non-directional finish. Wheelabrators readily fit into automated production lines, eliminate human error, and drastically reduce manual labor.

Over 100 successful deburring applications prove Wheelabrator's cost-cutting ability

A wide variety of Wheelabrator equipment is available for batch type or straight line deburring operations. For engineering consultation without obligation, write to Wheelabrator Corp., 510 S. Byrkit St., Mishawaka, Ind. In Canada, P.O. Box 490, Scarborough, Ontario.

Write for this Handbook illustrating deburring, deflashing, and cleaning operations with Wheelabrator Equipment. Ask for Catalog 143-D.

WHEELABRATOR
AIRLESS BLAST EQUIPMENT

assembly consists of one hose nipple and one yoke. The hose coupling assembly comes in five sizes to fit any hose outside diameter or wall thickness. (Band-It Co.)

For more data circle No. 51 on postcard, p. 251

Indicates Temperatures

Packaged temperature-indicating coatings offer systematically-spaced temperature ratings. They cover the range from 100° to 650°F, inclusive. The coatings come in a choice of the spray-type container or glass bottles with applicator brushes. The spray-can package meets the need for a convenient method of coating large surfaces with the liquid. (Tempil° Corp.)

For more data circle No. 52 on postcard, p. 251

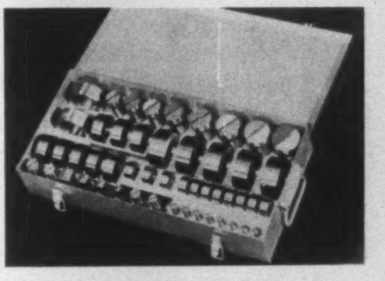
Valve Adapter

For hose connections, a flange adapter converts any standard gate or special valve of the 150 series in sizes 6, 8, and 12 in. The adapter increases the efficiency and ease of handling cumbersome flexible tanker or barge hoses to manifolds. Lugs extending beyond the lower lip of the adapter permit the workman to rest the heavy hose flange until it is properly aligned. (Kerotest Mfg. Co.)

For more data circle No. 53 on postcard, p. 251

Punch and Die Sets

Assortments of commonly used punch and die sets are packaged in specially-built metal containers.

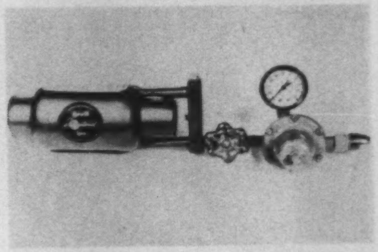


Two standard assortments of punches and dies are available. These punches and dies can be used in all hand- and power-operated punch presses as adapters. A major advantage of using the sets is reducing production delays. A press operator does not lose time looking for the right size punch and die. (O'Neil-Irwin Mfg. Co.)

For more data circle No. 54 on postcard, p. 251

Jet Flame Burners

Light-weight, LP-gas liquid burners are used wherever intense, even immediate heat is required. No pumping or pre-heating is required. They stay lit under any condition. The burners are very simple to operate. They perform at full capacity on any size container of bottled gas until the last drop is gone, summer or winter. (Corwill International Corp.)

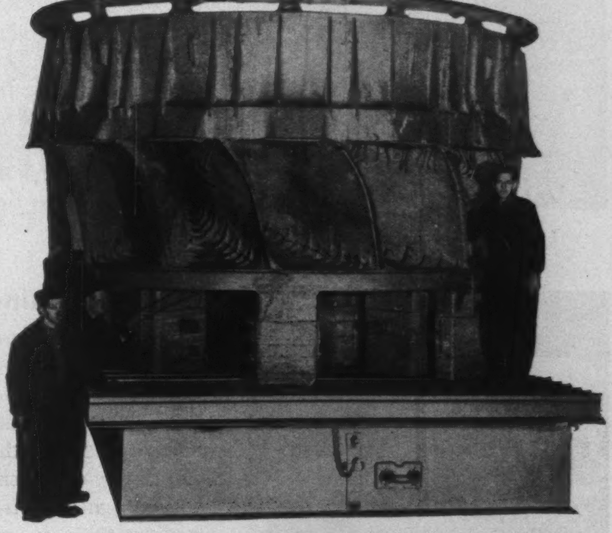


For more data circle No. 55 on postcard, p. 251

EXECUTIVE REPORT #21

THEY SAID "IT COULDN'T BE DONE"

but Wheelabrator® cleaned this 100-ton casting in 20 minutes



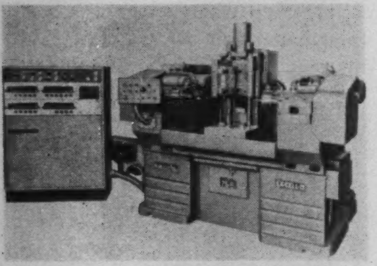
The enormity of a casting like this would have made it one of those "impossible" cleaning jobs by manual airblasting. But a Wheelabrator Car-Type Room equipped with 8 blasting wheels takes it in stride at Canadian Steel Foundries, Ltd. Here, castings measuring 20 ft. in diameter and over 12 ft. in height are cleaned thoroughly in blast cycles of only 15 to 20 minutes in the automated Wheelabrator room.

WHEELABRATOR
ROOMS

Wheelabrator engineers, leading in experience in designing machines for special applications, have developed a line of blast rooms employing unique work-handling methods suited to varied requirements. For illustrated examples, ask for Catalog 142-D. Wheelabrator Corp., 510 S. Byrkit St., Mishawaka, Ind. In Canada, P. O. Box 490, Scarborough, Ont.

WHEELABRATOR
AIRLESS BLAST EQUIPMENT

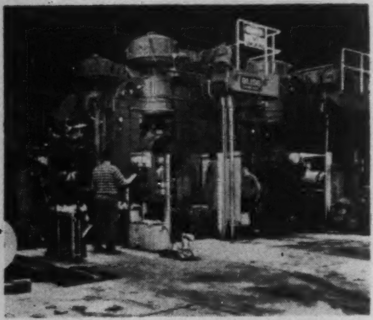
New Equipment and Machinery



Machine Selects Bore Size and Location

Tape controlled, a machine precision bores several holes of various diameters, in selected locations. The machine positions the work in relation to the boring tool. It also adjusts the boring tool to the required hole diameter, while the spindle is operating. Accuracy of hole diameter is held within 0.0005 in.; center locations within 0.0002 in. of true position. Boring depth is held within ±0.0005 in. A tool control mechanism controls the radius of tool rotation. (Ex-Cell-O Corp.)

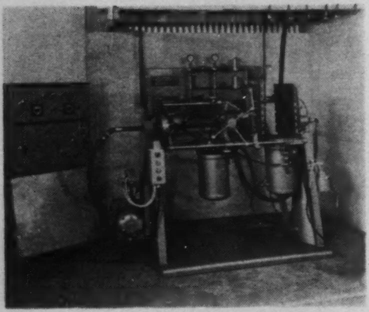
For more data circle No. 60 on postcard, p. 251



Tandem Mill Doubles Cold Rolling Capacity

Taking 50 pct reductions in each stand, a tandem mill takes ¼-in. coils and reduces the strip to 0.062 in. in a single pass. The run-out speed is 1500 fpm. Starting the strip into the first stand is done completely mechanically, beginning with a coil opener equipped with a peeler knife. An automatic edge guide control centers the strip. In the meantime, entry pinch rolls and a seven-roll bridle unit feed the strip into the bite of the work rolls. No manual handling at all is necessary. Cold rolling capacity is doubled with use of this mill. (E. W. Bliss Co.)

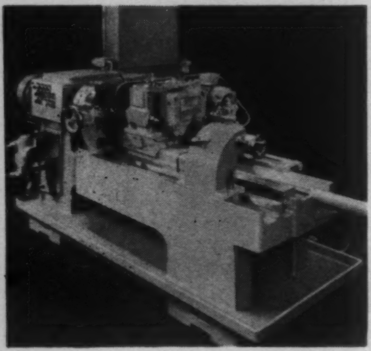
For more data circle No. 61 on postcard, p. 251



Shell Core Machine Gives High Volume Production

With completely automatic operations, a machine produces cores on a controlled cycle. All operations are easily variable for quick changeover. The operator has only to open and close the core box and remove the finished cores. It features an automatic, continuous supply of sand. This enables one operator to handle two or three machines at a minimum of labor cost. The variable program of the complete cycle allows drainage of the most complicated core. The unit uses natural, manufactured or bottled gas, thermostatically controlled. The heat is applied directly against the core box. (Dependable Shell Core Machines, Inc.)

For more data circle No. 62 on postcard, p. 251



Thread Milling Machine Produces Quality Threads

By sine bar adjustment and without changing any gears or cams, a machine mills left hand, right hand, external, internal, straight, tapered or special threads. A simple dial setting of the sine bar gives the desired right- or left-hand lead. Any lead up to ½-in. can be set from the dial reading which is graduated to 0.0002 in. The machine makes use of multiple thread cutters having no lead, but having the desired pitch and thread form. The machine feeds the cutter to depth. While the work makes one revolution, the cutter moves lengthwise revolution of the work piece. Threading may be done close to shoulders or to the bottom of blind holes. The cycle is completely automatic. (Sundstrand Corp.)

For more data circle No. 63 on postcard, p. 251

GRINDING WHEELS

"U.S." Grinding Wheels installed on Naxos-Union roll grinder.

"We're standardizing on 'U.S.' GRINDING WHEELS"

—Mr. Alex Munroe, Revere Copper & Brass, Inc.

After Alex Munroe of Revere's Baltimore plant installed "U.S." Grinding Wheels on their Naxos-Union roll grinders (for reconditioning rolls on their Sendzimir 51" rolling mill) several things were immediately apparent. Chatter was eliminated and stock removal was clean and efficient. Grinding time was cut approximately 30% while producing a regular finish.

That's why Revere is standardizing on "U.S." Grinding Wheels, not only on roll grinders but for reconditioning large back-up rolls. In fact, wherever "U.S." Wheels are used, performance reports have been excellent.

If you, as a manufacturer, want to reduce grinding wheel costs and increase production, "U.S." has what it takes. For "U.S." Wheels consistently outperform and reduce costs in case after case. Get in touch with your "U.S." Representative today or write or call the address below.

Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

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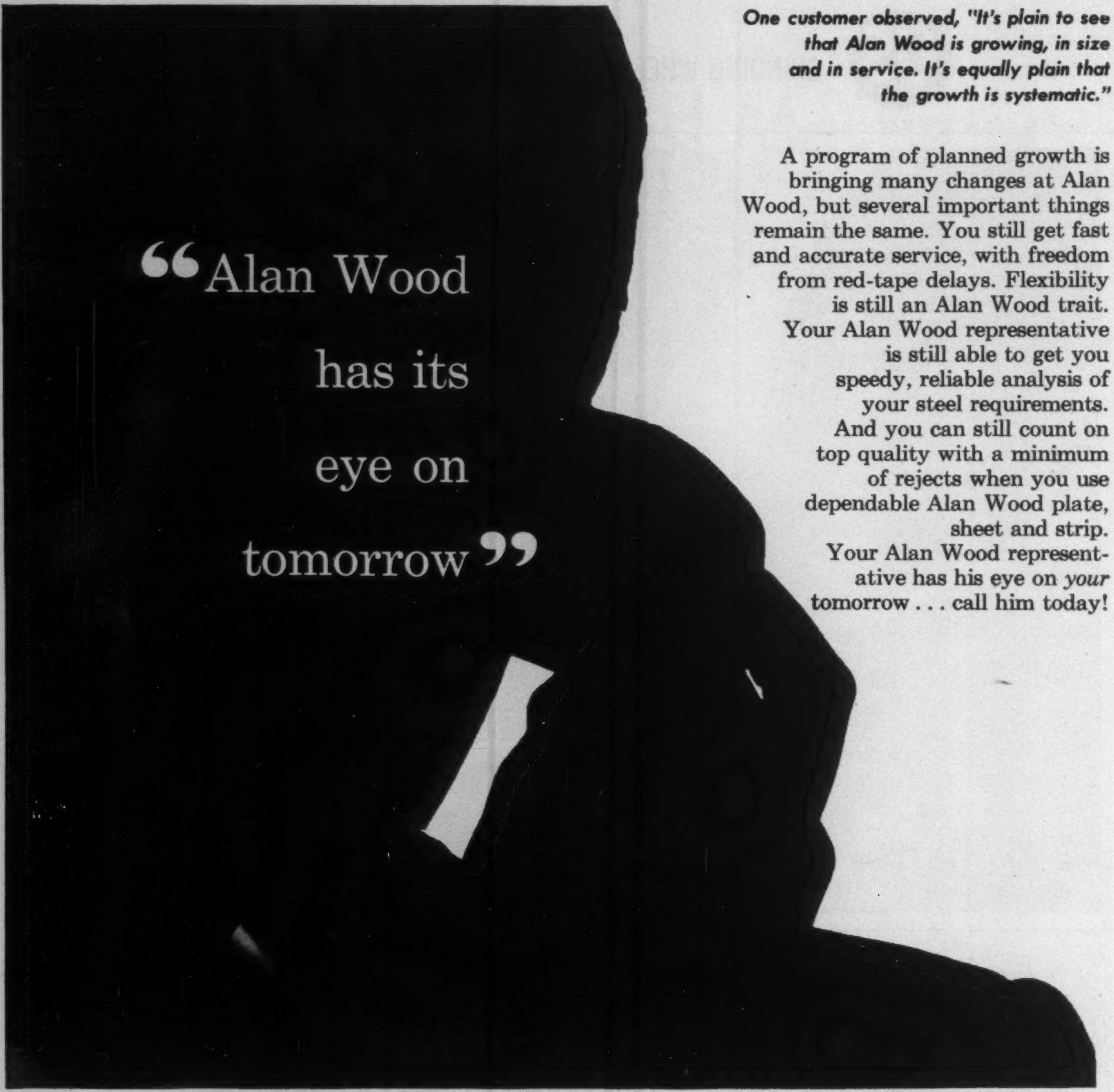

"Alan Wood has its eye on tomorrow"

One customer observed, "It's plain to see that Alan Wood is growing, in size and in service. It's equally plain that the growth is systematic."

A program of planned growth is bringing many changes at Alan Wood, but several important things remain the same. You still get fast and accurate service, with freedom from red-tape delays. Flexibility is still an Alan Wood trait. Your Alan Wood representative is still able to get you speedy, reliable analysis of your steel requirements. And you can still count on top quality with a minimum of rejects when you use dependable Alan Wood plate, sheet and strip. Your Alan Wood representative has his eye on *your* tomorrow . . . call him today!

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The Iron Age Summary

Cutbacks Nullify New Orders

A growing number of new orders is counterbalanced by automotive and tinplate cutbacks.

A better tone prevails in the market in spite of some threats to the flat-rolled picture.

▪ Crosscurrents in steel order trends have the market in an unsettled condition.

The plus and minus developments in the past week offset each other to the extent that no sharp change in the market is likely. Instead, the slow improvement at a less than seasonal rate will continue.

The Factors — These developments are balanced against each other in analyzing market trends:

On the positive side, a general overall improvement in new orders is almost universal.

On the negative side, more cutbacks in automotive orders and a severe drop in tinplate combine to weaken the flat-rolled market. Flat-rolled, it should be remembered, has been the strongest element in an overall weak market.

Based on the slow rate of improvement, top industry sources now predict the 1960 steel output will run between 101 and 104 million tons. This will still make the year the sixth highest in history.

Reasons Why—In analyzing the causes of the steel recession, these factors are the most significant:

Severe inventory cutbacks and controls were instituted by steel users when the post-strike buildup occurred. But as the cutbacks gained momentum, many major users felt the economic pinch and curtailed their own operations, and steel consumption. This carried mere inventory control into a long period of little steel ordering.

Secondly, the effects of steel imports in 1959 and in the first half of this year, plus the decline in exports in 1959, had a greater effect on the market than generally realized.

In 1959, stimulated by the steel strike, imports of steel reached 4.4 million tons. The rate was even stepped up to 2.4 million tons in the first half of this year. This includes substantial tonnages of cold-rolled sheet, not generally an import item. Although the trend is now reversed to some extent, the result was a large tonnage lost by U. S. producers.

The conviction is growing that in spite of a continued decline in the overall economy, the steel industry has seen the worst of it. In fact, if the expected comeback occurs in 1961, the steel industry can lead the way in the recovery period.

Auto Cutbacks—The automotive scare came when one General Motors operation cut its October order of steel more than 15 pct. While this one cutback may not be applicable to all suppliers, it's estimated that this division is cutting 35,000 cars out of its October schedule.

Coupled with Chrysler's reduction of some 30,000 cars from October, this means that 65,000 cars have already been taken out of the October program, once estimated at 685,000 units.

Steelmen hope the cutbacks and setbacks will stop here, but are keeping their fingers crossed.

Steel Output, Operating Rates

Production	This Week	Week Ago	Month Ago	Year Ago
(Net tons, 000 omitted)	1,500	1,558	1,401	362
Ingot Index				
(1947-1949=100)	93.4	97.0	87.2	22.5
Operating Rates				
North East Coast	64.0	65.0*	53.0	12.0†
Buffalo	9.0	42.0*	55.0	0.0†
Pittsburgh	45.0	46.0	38.0	30.0†
Youngstown	44.0	46.0*	36.0	10.0†
Cleveland	59.0	59.0*	45.0	0.0†
Detroit	72.0	67.0*	70.0	26.0†
Chicago	60.0	59.0*	58.0	5.0†
Cincinnati	62.0	61.0*	53.0	69.0†
St. Louis	78.0	79.0*	64.0	90.0†
South	53.0	49.0	50.0	12.0†
West	48.0	54.0*	52.0	0.0†
U. S. Rate	52.6	54.7	49.2	12.8

*Revised †IRON AGE Estimates

Source: American Iron and Steel Institute

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$29.83	$31.50	$32.50	$43.50
No. 2 bundles	$20.17	$21.17	$22.50	$29.83
Nonferrous				
Aluminum ingot	26.00	26.00	26.00	26.80
Copper, electrolytic	33.00	33.00	33.00	30-31.5
Lead, St. Louis	11.80	11.80	11.80	12.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	102.875	102.25	102.75	103.50
Zinc, E. St. Louis	13.00	13.00	13.00	12.00

Industrial Truck Leasing Grows

Whether buying or leasing, buyers are looking for automaticity and attachments that can "customize" their trucks.

Propane gas is getting a hard look by some buyers.

▪ Buyers are showing greater interest in leasing industrial power trucks. And more truck makers are offering leases.

Buyers are looking hard at the new variety of attachments that can "customize" their trucks to do the specific job needed.

And they are looking for more automaticity in their equipment.

Another closely checked factor in industrial truck buying is the fuel used. Propane gas has now been approved by more insurance companies, and in some sections of the country this is the "economy" fuel.

Leasing Up — Leasing has only come into its own in the industrial truck field in the last two years. The big equipment makers are leasing directly. Smaller companies are leasing through funding companies set up for that purpose.

While some leasing is done by the equipment-for-hire companies like Hertz and Ryder, these companies are mostly doing a rental business. They largely supply trucks to help users meet peak seasonal loads.

Because widespread leasing of industrial trucks is relatively new there are no exact figures on the actual extent. One major equipment maker says leasing now runs about 5 to 15 pct of sales. Another observer of the leasing trend, Yale & Towne's market research manager, John P. Horan, says: "The big interest drive behind leasing is conservation of working capital. Under present and developing business conditions it seems that industrial truck leasing will grow to fairly big proportions. The trend is up."

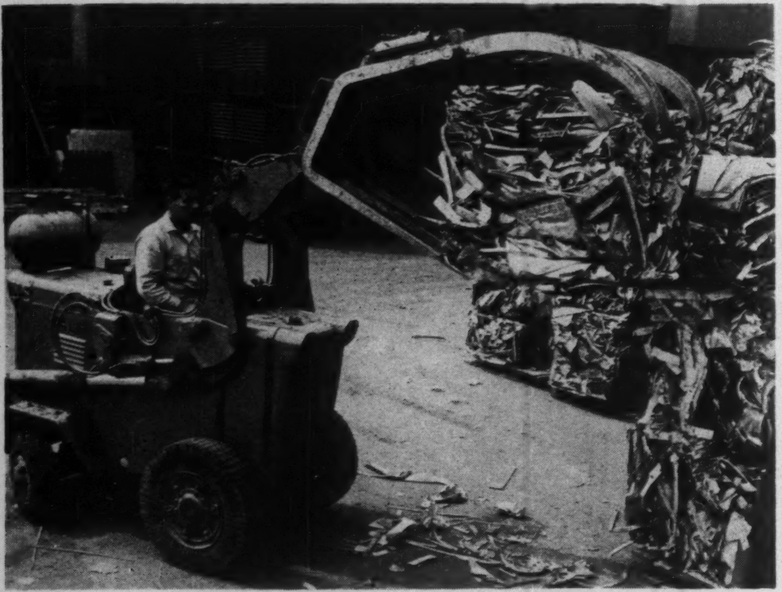
Trucks, in any quantity from one to a thousand or more, can be leased from the big truck makers. Lease periods vary, but most are for periods up to 5 years. All maintenance can be taken over by the leasing company, or can be done by the user.

Attachments—High construction costs of industrial buildings and warehouses has turned buyer interest to truck attachments that permit higher lifts and can be used in narrow aisles. Many of the new attachments allow pallet-less handling.

One of the new lifting and handling attachments is a vacuum device. This means cartons and other items can be stacked "shoulder-to-shoulder" as no side space is required to allow entry of attachment arms.

Another development is a truck that "brings the order picker to the work." This truck crawls horizontally into narrow aisles and by means of remote control reaches goods stacked in high narrow storage bays.

Fuels—There has been no recent shift in buyer performance in fuels for industrial power trucks. About 70 pct of truck sales are now in gas-powered models, 30 pct in electric power. Life expectancy for a gas truck runs about 5 years on an average, according to some industry spokesmen. But there are records of companies getting double or more that life from their gas trucks. Electric trucks can have life expectancies of 10 to 25 years, says one manufacturer.



BIG GRAB: Typical of attachments designed to do a specialized job is this scrap handler. The "claw" easily handles top-heavy scrap loads.

PROBLEM SOLVER

Tugit® gives men a work break that saves

Tugit is the compact, portable link chain hoist of countless uses — at any angle, anywhere. It gives maintenance men a real work break — is geared to lift a ton with only 40 lbs. of muscle effort. They use it for everything from positioning piping to placing machinery — with complete safety.

Whether Tugit is used for maintenance or production jobs indoors or outdoors, time, effort, and money are saved. Ask your Shaw-Box Distributor for a free demonstration. Tugit comes in ¾ to 3 ton capacities. Spark and corrosion resistant models. Write for Bulletin 15015-1C.

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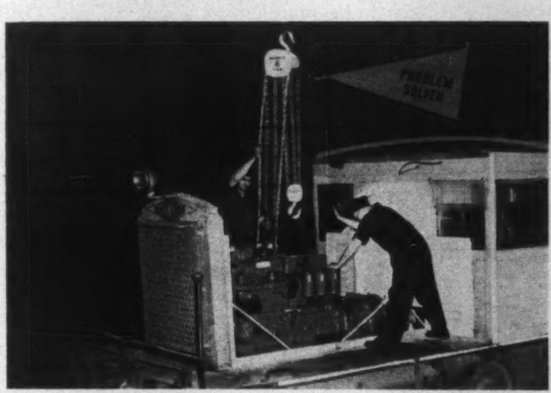

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Eliminate tough lifting and plant maintenance stops being a costly muscle-aching job. A large midwestern heavy equipment producer found this only too true. Now Budgit Aluminum Chain Blocks handle routine troublesome maintenance jobs — repairing furnaces, machinery, moving large pipe, motors, valves — that demand shifting as well as lifting. They are also solving handling problems at numerous metalworking machines.

Backsaving Budgit Chain Blocks can cut *your* costs. Capacities range to 10 tons. Spark and corrosion resistant models available. Ask your Shaw-Box Distributor for a demonstration. Or write for Bulletin 15025-1C.

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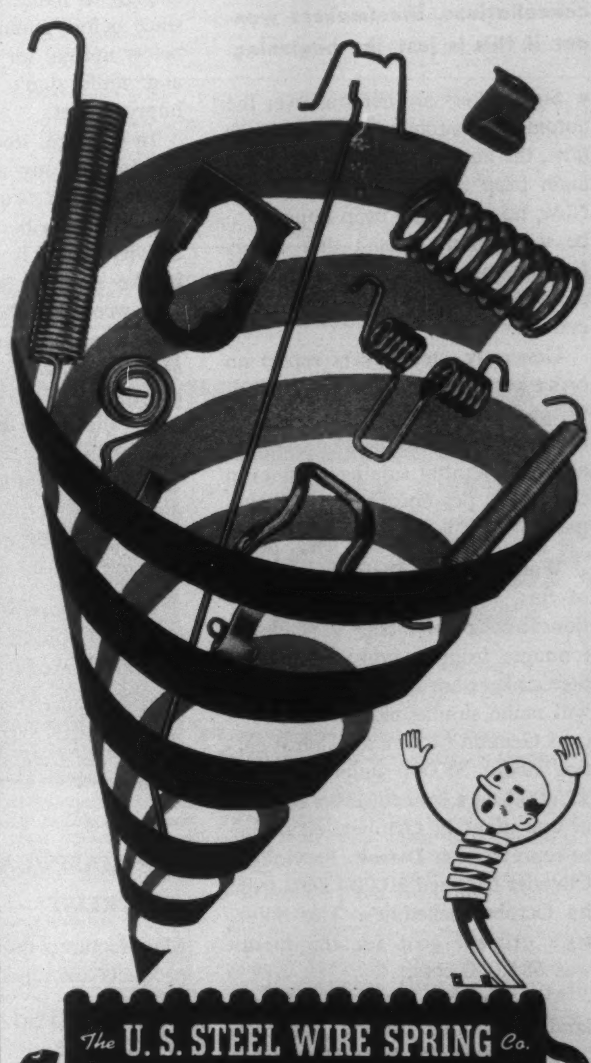

The **U. S. STEEL WIRE SPRING** *Co.*
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CLEVELAND 5, OHIO

Flat-Rolled Letting The Market Down?

The seasonal pickup in auto orders for flat-rolled products has been far below normal.

There have been a few big cancellations. Steelmakers wonder if this is just the beginning.

- Steelmakers are nervous over the automotive situation. For months now, the auto industry has been the main prop under the steel market. Now, however, the prop appears to be weakening. It isn't that orders for flat-rolled products aren't increasing; they aren't growing fast enough.

Generally, steelmakers report an order pickup in sheet and strip for October. However, increases are far below normal seasonal gains and are considerably smaller than even the most pessimistic have anticipated.

Watching and Waiting—On top of this, there have been cancellations and deferrments of October tonnages from several automakers. Steelmakers are wondering if others will make similar moves soon.

A General Motors division is cutting about 35,000 units from the 125,000 cars scheduled to be built at one plant in October, according to reports from **Detroit.** Previously, Chrysler trimmed 30,000 units from its October schedules. The industry's original goal for the month was 685,000 cars.

Miscellaneous buyers in **Cleveland** are taking up the slack left by auto setbacks from October to November. The month will show a net gain—but it will be much smaller than expected.

Seasonal and Unseasonal—The outlook in **Pittsburgh** isn't much brighter. There is a slight improvement in automotive sheet orders—enough to make it the best month since before summer. But it is still below normal for this time of year, and mills don't expect sustained improvement.

In **Chicago,** steel sales offices are grasping at any and every sign of improvement. Automotive releases are helping to boost sheet and strip activity. There is a gradual increase in the number of orders received each week. But the orders are small. And the additional orders will only raise shipments by about 5 pct this month.

At the same time, the tinplate market is going into its seasonal slowdown. A **Pittsburgh** mill reports it is receiving cancellations for the fourth quarter that more than offset cold-rolled sheet gains.

Bars—There is still no forward buying of cold-finished bars, says a **Pittsburgh** producer. September fizzled and auto industry plans are uncertain. The month is shaping up a little better than September in **Detroit,** or about the same as August. But this is only about 60 pct of what had been considered normal until this year. The hot-rolled bar market has only been limping along in **Chicago,** but it's beginning to snap out of it. However, demand will have to climb sharply before lead times move out. Level and pattern of business in **Cleveland** is about the same as for cold-rolled sheet.

Plate and Structural—Demand is low along the **East Coast** and mills are able to give fast delivery on any plate product. The situation is no better in **Chicago.** And the farm equipment industry in the **Midwest** has actually cutback some orders. However, mild gains are expected this month for heavy structurals which are moving fairly well.

Pipe and Tubing—There's little forward ordering. All products are slow along the **East Coast,** and some customers are asking about the possibility of price cuts. A **Pittsburgh** mill is running standard pipe facilities at about 30 pct of capacity, its seamless at about 50 pct. Drilling rates are at a 13-year low and imports are cutting into standard pipe sales. However, reports are trickling in that jobber stocks are finally nearing bottom. Home construction is supporting the market for small pipe produced in the **Cleveland** district but the season should end soon.

Stainless—Deliveries are still being made off the shelf for most products. And stainless sales offices in **Detroit** say it hasn't been a good year despite the fact peaks and valleys of demand have been absent. **West Coast** will get its first stainless steel producing plant in about a year. New Pacific Rolling Mills, Inc., is building a 150,000 ton capacity mill at **Cucamonga,** Calif. Products will include alloy and stainless steel bars, squares, flats, channel and angles, in sizes ranging from one-quarter to four in. In addition, it will make forging billets of alloy and stainless steel.

PURCHASING AGENT'S CHECKLIST

Manufacturers must make sure their products are suited to users. P. 131

Congress gets set to study problem of imports. P. 133

How to get more for your metalworking dollar — high-strength steels. P. 167

COMPARISON OF PRICES

(Effective Oct. 4, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Oct. 4 1960	Sept. 27 1960	Sept. 6 1960	Oct. 6 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Oct. 4 1960	Sept. 27 1960	Sept. 6 1960	Oct. 6 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, South Cin'ti.	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	11.00	11.00	11.00	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$29.50*	$31.50	$31.50	$45.50
No. 1 steel, Phila. area	33.50*	34.50	34.50	43.50
No. 1 steel, Chicago	26.50*	28.50	31.50	41.50
No. 1 bundles, Detroit	26.50*	27.50	28.50	39.50
Low phos., Youngstown	33.00*	33.50	35.50	46.50
No. 1 mach'y cast, Pittsburgh	45.50*	47.50	47.50	53.50
No. 1 mach'y cast, Phila.	49.50	49.50	49.50	53.50
No. 1 mach'y cast, Chicago	41.50*	43.50	47.00	63.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$29.83*	$31.50	$32.50	$43.50
No. 2 bundles	20.17*	21.17	22.50	29.83
Coke, Connelsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	33.00	30-31.50
Copper, Lake, Conn.	33.00	33.00	33.00	31.50
Tin, Straits, N. Y.	102.075†	102.25	102.75	102.50
Zinc, East St. Louis	13.00	13.00	13.00	12.00
Lead, St. Louis	11.80	11.80	11.80	12.80
Aluminum, ingot	26.00	26.00	26.00	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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* Appears in the Sept. 29- Oct. 13 issues.

Handling Coil Stock?

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ADVANTAGES

- 1 Lifter handles wide range of coil sizes
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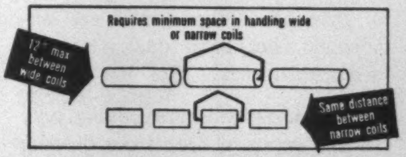

Requires minimum space in handling wide or narrow coils
12" max between wide coils
Same distance between narrow coils

CULLEN-FRIESTEDT CO.

1303 South Kilbourn Avenue • Chicago 23, Illinois

Prices Are Lowest In Six Years

Scrap prices this week are at the lowest level since September, 1954.

Also, earlier reports that exports would drop off in the fourth quarter appear to be coming true.

▪ Scrap prices are down to their lowest level in six years.

The IRON AGE composite for No. 1 heavy melting dropped this week from $31.50 to $29.83. This is the lowest it has been since September, 1954, when the composite price was $29.71. One year ago, the composite price for No. 1 heavy melting was $43.50. Also, this week the composite for No. 2 bundles dropped from $21.17 to $20.17.

A sharp drop in industrial prices drove the entire Pittsburgh market down this week. And, in Chicago, the market continues to slide.

Also, earlier reports that the fourth quarter would bring slackening export demand for scrap are coming true. With the fourth quarter barely one week old, there are reports of lower export prices from the West Coast and New York.

Detroit dealers have written-off overseas shipments for the rest of this year; Philadelphia prices are weakening.

Pittsburgh—A sharp drop in industrial prices drove the whole market down this week. Locally, factory bundles went for about $3 under last month's price. An early railroad list also showed prices down about $3 from a month ago. In the dealer market, a mill on the fringe of the district cut $2 off its price for No. 2 bundles. As a result of this week's slide, the price of No. 1 heavy melting has fallen to its lowest point since 1954.

Chicago—The market continues its uninterrupted slide, after the factory bundle price collapsed last week. A second major automotive list went off another $1. The price drop is general, with slipping even in the stainless grades. Dealers show little tendency to buck the trend and are selling at the sinking levels. A major industrial list closing near press time last week established a price of $32 to $33, effective Sept. 27, for No. 1 factory bundles.

Philadelphia — Scrap prices are holding firm, though some grades are down $1 this week. One dealer notes, "As long as we have export activity, we'll be in fair shape." However, there are reports that export prices may drop in the near future. For the present, export prices are unchanged, but on the soft side. The lack of domestic business makes it difficult to establish any really significant price changes.

New York—The market is definitely weaker this week. A combination of increased supply and easing export demand has most prices teetering. Machine shop turnings are off $1 with an almost complete lack of demand. Other prices are unchanged, but local dealers expect drops this week.

Detroit — Mills are buying only enough scrap to keep from dipping into their stockpiles. Most dealers believe prices will remain at the present low level into December. Canadians helped the bundle market for October. However, most overseas shipments have been written-off for the rest of this year.

Cleveland—The market dropped another $1 in Cleveland as heavy tonnage of industrial scrap continues to overhang the area. One Valley mill bought special electric furnace grades at $33.50, for the first big purchase in months. Bargain prices may smoke out other buyers too, but the prices may still drop lower.

Cincinnati — Top dealer grades are off as much as $1.50. Only one local mill is still in the market, and even this is for small tonnage. A large industrial list was off $4.50 from one month ago.

St. Louis—Scrap prices went lower again this week with most items dropping $1. One mill is completely out of the market. Brokers who are selling are doing so in desperation.

Birmingham—The market reflects the usual end-of-the-month slowness. However, some foundry grades moved at established prices. Brokers say the market looks "soft," reflecting conditions in the North. Consumers report scrap offered at competitive prices from as far northwest as Minnesota.

Buffalo—All prices remain the same, but the scrap picture is further darkened by a local railroad strike. Activity is still next to nothing.

Boston — Primary steelmaking grades dropped $1 as the market weakened after weeks of little change. Some export is the only movement.

West Coast—As predicted, scrap prices dropped all along the coast. Some dealers say they wouldn't be surprised to see prices go even softer. Exporters are in no hurry to have orders filled.

Houston—The market is retaining its status quo although brokers expect price cuts. A district mill says it doesn't plan additional purchases until next week. One exporter declined to quote prices because of market softness.

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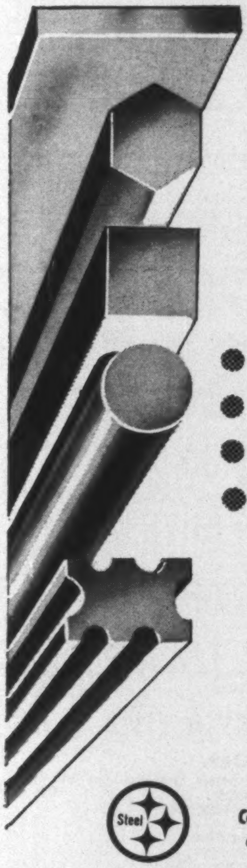

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54

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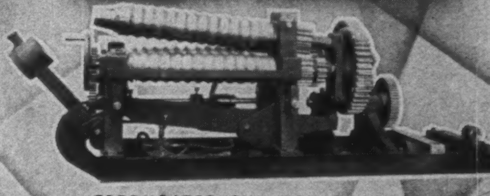

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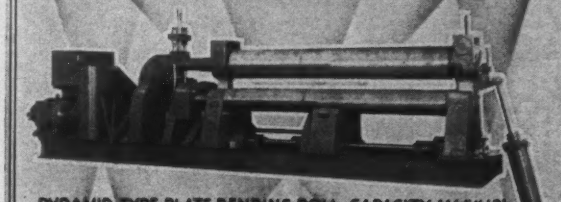
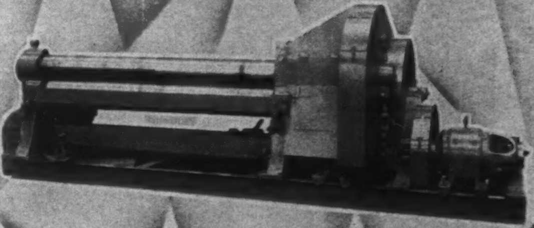
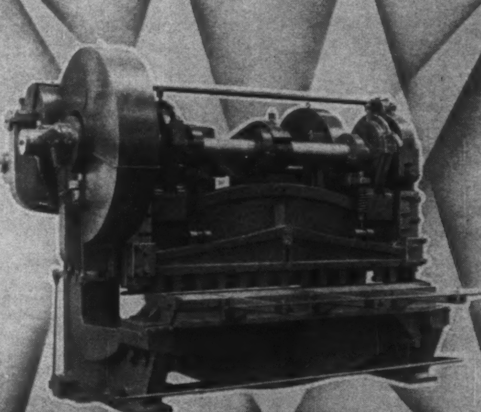


PYRAMID TYPE PLATE BENDING ROLL, CAPACITY 1¼"X12'



INITIAL PINCH TYPE PLATE BENDING ROLL, CAPACITY ½"X8'



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CAMBRIDGE CITY INDIANA

SCRAP PRICES *(Effective Oct. 4, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	30.00 to 31.00
No. 1 factory bundles	35.00 to 36.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos. punch'gs plate	36.00 to 37.00
Heavy turnings	25.00 to 26.00
No. 1 RR hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	44.00 to 45.00
Rails 2 ft. and under	48.00 to 49.00
RR specialties	42.00 to 43.00
No. 1 machinery cast	45.00 to 46.00
Cupola cast	35.00 to 36.00
Heavy breakable cast	33.00 to 34.00
Stainless	
18-8 bundles and solids	185.00 to 190.00
18-8 turnings	95.00 to 100.00
430 bundles and solids	90.00 to 95.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy melting	24.00 to 25.00
No. 1 dealer bundles	27.00 to 28.00
No. 1 factory bundles	31.00 to 32.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	26.00 to 28.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. forge crops	36.00 to 37.00
Low phos, punch'gs plate, ¼ in. and heavier	32.00 to 33.00
Low phos. 2 ft. and under.	30.00 to 31.00
No. 1 RR hvy. melting	31.00 to 32.00
Scrap rails, random lgth.	38.00 to 39.00
Rerolling rails	48.00 to 50.00
Rails 2 ft. and under	42.00 to 43.00
Angles and splice bars	39.00 to 40.00
RR steel car axles	47.00 to 48.00
RR couplers and knuckles.	36.00 to 37.00
No. 1 machinery cast.	41.00 to 42.00
Cupola cast.	36.00 to 37.00
Cast iron wheel	27.00 to 28.00
Malleable	40.00 to 41.00
Stove plate	30.00 to 31.00
Steel car wheels	35.00 to 36.00
Stainless	
18-8 bundles and solids	165.00 to 170.00
18-8 turnings	80.00 to 85.00
430 bundles and solids	80.00 to 85.00
430 turnings	40.00 to 45.00

Philadelphia Area

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	14.00 to 15.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	20.00 to 21.00
Clean cast. chem. borings.	23.00 to 24.00
Low phos. 5 ft and under	37.00 to 38.00
Low phos. 2 ft punch'gs	39.00 to 40.00
Elec. furnace bundles	36.00 to 37.00
Heavy turnings	27.00 to 28.00
RR specialties	39.00 to 40.00
Rails, 18 in. and under	50.00 to 51.00
Cupola cast.	38.00 to 39.00
Heavy breakable cast.	37.00 to 38.00
Cast iron car wheels	40.00 to 41.00
Malleable	45.00 to 46.00
No. 1 machinery cast.	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.00 to $25.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	24.00 to 25.00
No. 2 bundles	16.00 to 17.00
Machine shop turn.	8.00 to 9.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	10.00 to 11.00
Low phos. 18 in. and under	33.00 to 34.00
Rails, random length	39.00 to 40.00
Rails, 18 in. and under	46.00 to 47.00
No. 1 cupola cast	35.00 to 36.00
Hvy. breakable cast.	30.00 to 31.00
Drop broken cast.	45.00 to 46.00

Youngstown

No. 1 hvy. melting	$30.50 to $31.50
No. 2 hvy. melting	23.50 to 24.50
No. 1 dealer bundles	30.50 to 31.50
No. 2 bundles	20.50 to 21.50
Machine shop turn.	14.50 to 15.50
Shoveling turnings	16.50 to 17.50
Low phos. plate	32.50 to 33.50

Cleveland

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	19.50 to 20.50
No. 1 dealer bundles	28.00 to 29.00
No. 1 factory bundles	31.00 to 32.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	28.00 to 29.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Cut structural & plates, 2 ft. & under	33.00 to 34.00
Low phos. punch'gs plate.	29.00 to 30.00
Drop forge flashings	28.00 to 29.00
Foundry steel, 2 ft. & under	31.00 to 32.00
No. 1 RR hvy. melting	32.00 to 33.00
Rails 2 ft. and under	47.00 to 48.00
Rails 18 in. and under	48.00 to 49.00
Steel axle turnings	22.00 to 23.00
Railroad cast.	45.00 to 46.00
No. 1 machinery cast.	48.00 to 49.00
Stove plate	37.00 to 38.00
Malleable	43.00 to 44.00
Stainless	
18-8 bundles	180.00 to 185.00
18-8 turnings	75.00 to 80.00
430 bundles	80.00 to 85.00

Buffalo

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 busheling	27.00 to 28.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	19.00 to 20.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	13.00 to 14.00
Low phos. plate	34.00 to 35.00
Structurals and plate, 2 ft. and under	36.00 to 37.00
Scrap rails, random lgth.	35.00 to 36.00
Rails 2 ft. and under	45.00 to 46.00
No. 1 machinery cast.	45.00 to 46.00
No. 1 cupola cast.	39.00 to 40.00

St. Louis

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	26.00 to 27.00
Foundry steel, 2 ft.	28.00 to 29.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	7.00 to 8.00
Shoveling turnings	9.00 to 10.00
Cast iron borings	19.00 to 20.00
No. 1 RR hvy. melting	30.00 to 31.00
Rails, random lengths	36.00 to 37.00
Rails, 18 in. and under	38.00 to 39.00
RR specialties	38.00 to 39.00
Cupola cast.	42.00 to 43.00
Heavy breakable cast.	34.00 to 35.00
Stove plate	36.00 to 37.00
Cast iron car wheels	34.00 to 35.00
Rerolling rails	50.00 to 51.00
Unstripped motor blocks	35.00 to 36.00

Birmingham

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	32.00 to 33.00
Elec. furnace, 3 ft. & under	35.00 to 36.00
Bar crops and plate	39.00 to 40.00
Structural and plate, 2 ft.	38.00 to 39.00
No. 1 RR hvy. melting	33.00 to 34.00
Scrap rail, random lgth.	39.00 to 40.00
Rails, 18 in. and under	44.00 to 45.00
Angles and splice bars	38.00 to 39.00
No. 1 cupola cast.	47.00 to 48.00
Stove plate	47.00 to 48.00
Cast iron car wheels	38.00 to 39.00
Unstripped motor blocks	34.00 to 35.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 dealer bundles	16.00 to 17.00
Machine shop turnings	6.00 to 7.00
Mixed bor. and turn.	9.00 to 10.00
Shoveling turnings	10.00 to 11.00
Clean cast. chem. borings	18.00 to 19.00
No. 1 machinery cast.	37.00 to 38.00
Mixed yard cast.	33.00 to 34.00
Heavy breakable cast.	31.00 to 32.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	70.00 to 75.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$23.00 to $24.00
No. 2 hvy. melting	17.00 to 18.00
No. 1 dealer bundles	26.00 to 27.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	23.00 to 24.00
Drop forge flashings	23.00 to 24.00
Machine shop turn.	9.00 to 10.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	12.00 to 13.00
Heavy breakable cast.	29.00 to 30.00
Mixed cupola cast.	33.00 to 34.00
Automotive cast.	41.00 to 42.00
Stainless	
18-8 bundles and solids	165.00 to 170.00
18-8 turnings	55.00 to 60.00
430 bundles and solids	55.00 to 60.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.00 to $25.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	24.00 to 25.00
No. 2 bundles	14.00 to 15.00
No. 1 busheling	24.00 to 25.00
Machine shop turn.	5.00 to 6.00
Shoveling turnings	8.00 to 9.00
Clean cast. chem. borings.	12.00 to 13.00
No. 1 machinery cast.	38.00 to 39.00
Mixed cupola cast.	32.00 to 33.00
Heavy breakable cast.	27.50 to 28.50

San Francisco

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	29.00
No. 1 dealer bundles	$27.00 to 28.00
No. 2 bundles	18.00
Machine shop turn.	14.00
Cast iron borings	14.00
No. 1 cupola cast.	45.00

Los Angeles

No. 1 hvy. melting	$30.00
No. 2 hvy. melting	27.00
No. 1 dealer bundles	25.00
No. 2 bundles	17.00
Machine shop turn.	12.00
Shoveling turnings	13.00
Cast iron borings	13.00
Elec. furnace 1 ft. and under (foundry)	41.00
No. 1 cupola cast.	40.00

Seattle

No. 1 hvy. melting	$33.00
No. 2 hvy. melting	31.00
No. 2 bundles	21.00
No. 1 cupola cast.	36.00
Mixed yard cast.	31.00

Hamilton, Ont.

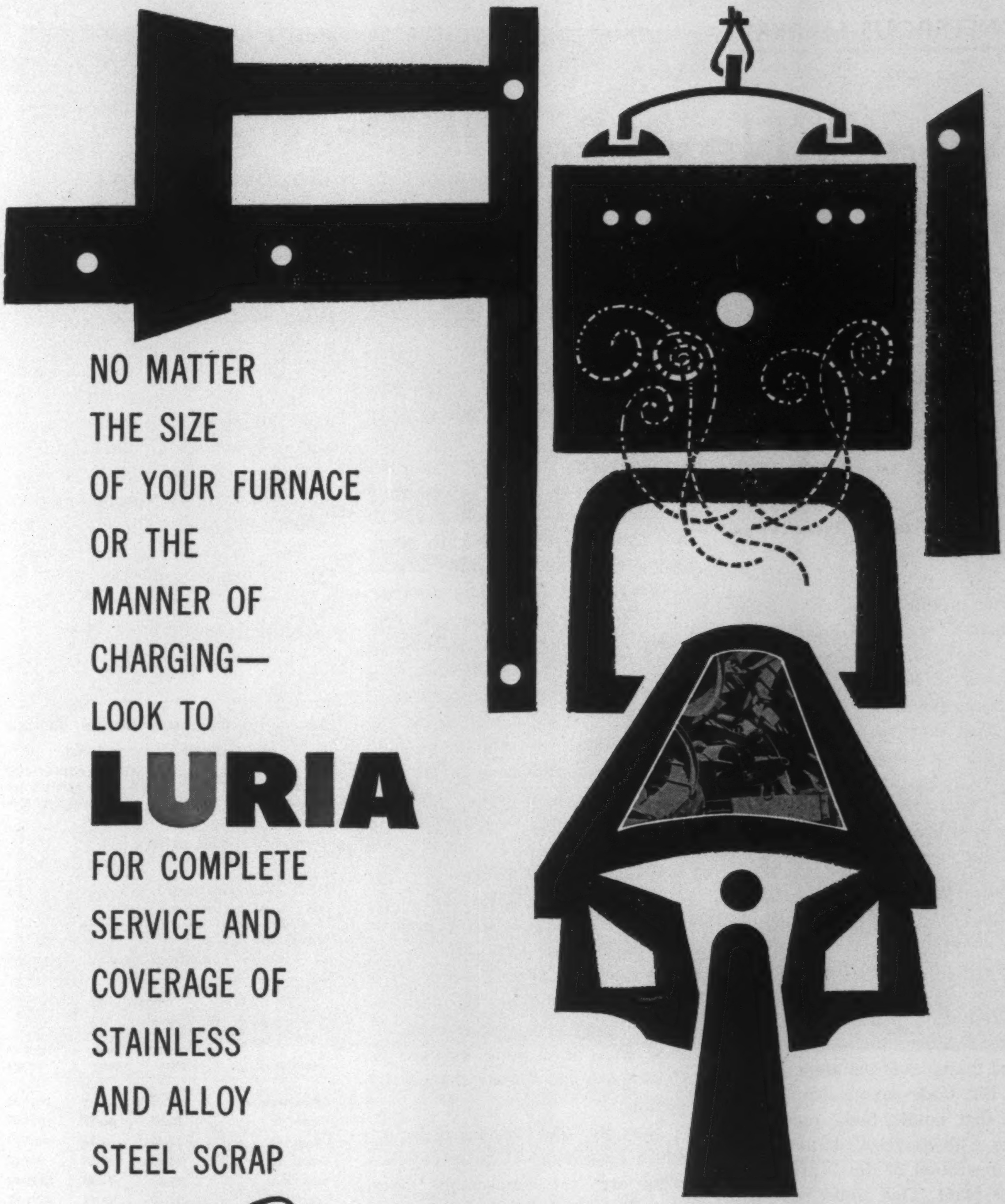
Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$25.80
No. 2 hvy. melting cut 3 ft. and under	22.50
No. 1 dealer bundles	25.80
No. 2 bundles	19.00
Mixed steel scrap	16.00
Bush., new fact., prep'd	25.50
Bush., new fact., unprep'd	20.45
Machine shop turn.	10.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	33.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	31.00
No. 2 bundles	18.00
Machine shop turn.	12.00
Shoveling turnings	14.00
Cut structural plate 2 ft. & under	$40.00 to 41.00
Unstripped motor blocks	26.00 to 27.00
Cupola cast.	33.00 to 34.00
Heavy breakable cast.	25.00 to 26.00



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What's Next For Nicaro Plant?

Nickel industry speculates on what may happen following U. S. action in closing down the plant.

Cubans face problems whether or not to seize the installation, then how to run it.

▪ After months of continuous harrassment from the Cuban government, the U. S. finally decided, late last week, to close its Nicaro nickel processing plant.

Nickel industry sources in the U. S. say the market won't feel the Nicaro closing even slightly for a while. One reason: There's still more than a one-year stock of unsold Nicaro nickel in the U. S.

Future Moves? — The shutdown shouldn't hurt much until that stock starts to disappear. And many say the full implications of the move may not be known for that period.

It's difficult finding anyone willing to concede that Cuba doesn't intend taking over the plant eventually. But trade sources say it's not quite that simple. Some reports indicate Cubans have already taken over operation of the $110 million dollar plant. This could be a preliminary move toward outright seizure of the installation by the Cuban government.

Operating Problems—It's also reported that an embargo will soon be placed on shipments of spare parts going to Cuba (for the Nicaro plant and others). Technical people in the nickel industry say if Nicaro stays closed for very long its going to take boatloads of parts, and much know-how, to get it going again.

One source says the supply problem goes even further. Apparently ammonia is a vital constituent to the operation of the Nicaro plant. And there are very few sources within economic shipping distance.

There's another subtle, and possibly more important, factor. A source close to Nicaro calculates that no matter what Premier Castro does it will take a year to get the plant producing without the help of U. S. supplies and technicians. "And," this man says, "I expect some interesting developments in that time."

When Freeport Nickel Co. lost its concentrator at Moa Bay, Cuba, company executives made it clear they would bide their time to see how things developed.

Apparently there's a growing feeling among American businessmen who have done business in Cuba that some definite changes are coming.

Actually, the two major factors which caused the U. S. to close its plant are: (1) confiscatory taxes, and (2) Cuba's "ridiculously low" offer to buy the plant.

Russian Aid? — Reports from Washington say the U. S. tried to negotiate with the tax problem with Cuba, but that the Cubans refused to budge.

Total U. S. investment in the 50 million lb plant is almost $110 million. It has been operating consistently at a profit. Cuba offered a little over $5 million, and it wasn't made clear whether this was to be in dollars or government bonds.

Copper

U. S. custom smelters lowered their prices for copper by 2¢ per pound, to 31¢, effective Oct. 3. The smelters have been quoting 33¢ since March.

Producers are still holding at 33¢ per lb. They expect to maintain this level unless the pressure gets too great from customers, or unless the custom smelter move brings in much more business. Producers maintain that dropping prices seldom stimulates buying.

Tin prices for the week: Sept. 28 — 103.00; Sept. 29 — 103.50; Sept. 30 — 103.25; Oct. 3 — 102.875; Oct. 4—102.75.*

*Estimate.

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in SEPTEMBER based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper, del'd Conn. Valley	33.00
Copper, Lake	33.00
Straits, Tin, New York	102.853
Zinc, E. St. Louis	12.90
Lead, St. Louis	11.80
Aluminum ingot	28.10

Note: Quotations are on going prices

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum Ingot	26.00	24.70	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	31.00	33.00	10/3/60
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium Ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/8/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot **COPPER:** (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. **LEAD:** common grade. **MAGNESIUM:** 99.8% pig Velasco, Tex. **NICKEL:** Port Colborne, Canada. **ZINC:** prime western. **TIN:** See above; Other primary prices, pg. 272.

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"BRISTOL FASHION" MEANS BRASS AT ITS BEST

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.038	.048-.061	.077-.096	.136-.250
1100, 3003	48.4	47.4	46.4	45.4
5052	55.8	53.0	50.8	49.2
6061-0	53.0	50.3	48.4	47.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-5/16	11/32-23/32	3/4-1 1/16	1 3/32-1 1/2
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type ↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand, Grade	......	67.9	69.0	77.9	103.1
AZ31B Spec.	......	93.3	96.9	108.7	171.3
Tread Plate	......	70.6	71.7	......	......
Tooling Plate	73.0	......	......	......	......

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting)	37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting)	40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	....	48.68	58.78
Munts Metal	53.20	....	48.26	....
Momm. Bz.	56.17	56.46	55.86	59.48
Mang. Bz.	58.86	....	52.21	....
Phos. Bz. 5%	77.44	....	78.10	....

Free Cutting Brass Rod 36.06

TITANIUM

(Base Prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.	29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be	$65.00
Beryllium copper, per lb conta'd Be	$43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading	$70.00
Bismuth, ton lots	$ 2.25
Cadmium, del'd	$ 1.50
Calcium, 99.9% small lots	$ 4.55
Chromium, 99.8% metallic base	$ 1.31
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Germanium, per gm, f.o.b. Miami, Okla., refined	$29.95 to $36.95
Gold, U. S. Treas., per troy oz.	$35.00
Indium, 99.9%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$75 to $85
Lithium, 98%	$9.00 to $12.00
Magnesium sticks, 10,000 lb.	57.00
Mercury, dollars per 76-lb flask f.o.b. New York	$208 to $210
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel	69.60
Palladium, dollars per troy oz.	$24 to $26
Platinum, dollars per troy oz.	$82 to $85
Rhodium	$137 to $140
Silver ingots (¢ per troy oz.)	91.375
Thorium, per kg.	$43.00
Vanadium	$ 3.65
Zirconium sponge	$ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot	
No. 115	29.25
No. 120	28.25
No. 123	27.25
80-10-10 ingot	
No. 305	33.75
No. 315	31.50
88-10-2 ingot	
No. 210	42.00
No. 215	38.75
No. 245	34.00
Yellow ingot	
No. 405	23.75
Manganese bronze	
No. 421	28.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper max.	25.25-25.50
0.60 copper max.	25.00-25.25
Piston alloys (No. 132 type)	27.00-28.00
No. 12 alum. (No. 2 grade)	23.75-24.25
108 alloy	24.25-24.75
195 alloy	26.75-27.75
13 alloy (0.60 copper max.)	24.75-25.00
AXS-679 (1 pct zinc)	24.00-25.00

(Effective Oct. 4, 1960)

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½%	24.75-25.75
Grade 2—92-95%	23.50-24.50
Grade 3—90-92%	22.50-23.50
Grade 4—85-90%	22.00-23.00

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25¾	25
Comm. bronze	26½	26
Mang. bronze	20¾	20
Free cutting rod ends.	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	26
No. 2 copper wire	24
Light copper	21¾
*Refinery brass	22
Copper bearing material	21

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	25
No. 2 copper wire	24
Light copper	21¾
No. 1 composition	20¾
No. 1 comp. turnings	20½
Hvy. yellow brass solids	15¾
Brass pipe	14¼
Radiators	16½
Aluminum	
Mixed old cast.	13—13½
Mixed new clips	14½—15
Mixed turnings, dry	13½—14

Dealers' Scrap

(Dealers' Buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	23—23½
No. 2 copper wire	21—21½
Light copper	19—19½
Auto radiators (unsweated)	13—13½
No. 1 composition	17½—18
No. 1 composition turnings	16¼—16¾
Cocks and faucets	13½—14
Clean heavy yellow brass	12½—13
Brass pipe	14—14½
New soft brass clippings	14¼—14¾
No. 1 brass rod turnings	13—13½

Aluminum

Alum. pistons and struts	7½— 8
Aluminum crankcase	9½—10
1100 (2s) aluminum clippings	12½—13
Old sheet and utensils	9½—10
Borings and turnings	5½— 6
Industrial castings	10—10½
2020 (24s) clippings	12½—13

Zinc

New zinc clippings	7 — 7¼
Old zinc	4½— 5
Zinc routings	3¼— 3½
Old die cast scrap	2¾— 3

Nickel and Monel

Pure nickel clippings	52-54
Clean nickel turnings	40
Nickel anodes	52-54
Nickel rod ends	52-54
New Monel clippings	23-23.50
Clean Monel turnings	16.50-17
Old sheet Monel	22-23
Nickel silver clippings, mixed	18
Nickel silver turnings, mixed.	15

Lead

Soft scrap lead	8 — 8¼
Battery plates (dry)	3 — 3¼
Batteries, acid free	2 — 2¼

Miscellaneous

Block tin	79—80
No. 1 pewter	59—60
Auto babbitt	43—44
Mixed common babbitt	10¼—10¾
Solder joints	14½—15
Siphon tops	41
Small foundry type	9¾—10¼
Monotype	9¾—10¼
Lino. and stereotype	8¾— 9
Electrotype	7½— 7¾
Hand picked type shells	5¼— 5¾
Lino. and stereo. dross	2¼— 2¾
Electro dross	2¼— 2¾

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Castle, Pa.									7.425* *M10*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1; C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras.

(Effective Oct. 3, 1960)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 1.25-lb. base box	Electro** 0.25-lb. base box	Holloware Enameling 29 ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3,W8*			
	Sterling, Ill.									6.50 *N4,K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3,Y1*	6.275 *U1, I3,Y1*	6.875 *U1, I3*	6.775 *U1, I3,Y1*	7.225 *U1*	7.525 *U1, Y1,I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1,Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3*,				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3,P6*	6.275 *U1, J3,P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3,P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3,W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Terrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2,R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

* Electrogalvanized sheets.

(Effective Oct. 3, 1960)

*7.425 at Sharon-Niles is 7.225

IRON AGE

STEEL PRICES

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		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5 675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*				7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*		7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.25 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Oct. 3, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1	Acme Steel Co., Chicago
A2	Alan Wood Steel Co., Conshohocken, Pa.
A3	Allegheny Ludlum Steel Corp., Pittsburgh
A4	American Cladmetals Co., Carnegie, Pa.
A5	American Steel & Wire Div., Cleveland
A6	Angel Nail & Chaplet Co., Cleveland
A7	Armco Steel Corp., Middletown, Ohio
A8	Atlantic Steel Co., Atlanta, Ga.
A9	Acme-Newport Steel Co., Newport, Ky.
A10	Alaska Steel Mills, Inc., Seattle, Wash.
B1	Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2	Bethlehem Steel Co., Pacific Coast Div.
B3	Bethlehem Steel Co., Bethlehem, Pa.
B4	Blair Strip Steel Co., New Castle, Pa.
B5	Bliss & Laughlin, Inc., Harvey, Ill.
B6	Brooke Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7	A. M. Byers, Pittsburgh
B8	Braeburn Alloy Steel Corp., Braeburn, Pa.
C1	Calstrip Steel Corp., Los Angeles
C2	Carpenter Steel Co., Reading, Pa.
C4	Claymont Products Dept., Claymont, Del.
C6	Colorado Fuel & Iron Corp., Denver
C7	Columbia Geneva Steel Div., San Francisco
C8	Columbia Steel & Shafting Co., Pittsburgh
C9	Continental Steel Corp., Kokomo, Ind.
C10	Copperweld Steel Co., Pittsburgh, Pa.
C11	Crucible Steel Co. of America, Pittsburgh
C13	Cuyahoga Steel & Wire Co., Cleveland
C14	Compressed Steel Shafting Co., Readville, Mass.
C15	G. O. Carlson, Inc., Thorndale, Pa.
C16	Connors Steel Div., Birmingham
C18	Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.
D1	Detroit Steel Corp., Detroit
D2	Driver, Wilbur B., Co., Newark, N. J.
D3	Driver Harris Co., Harrison, N. J.
D4	Dickson Weatherproof Nail Co., Evanston, Ill.
E1	Eastern Stainless Steel Corp., Baltimore
E2	Empire-Reeves Steel Corp., Mansfield, O.
E3	Enamel Products & Plating Co., McKeesport, Pa.
F1	Firth Sterling, Inc., McKeesport, Pa.
F2	Fitzsimons Steel Corp., Youngstown
F3	Follansbee Steel Corp., Follansbee, W. Va.
G2	Granite City Steel Co., Granite City, Ill.
G3	Great Lakes Steel Corp., Detroit
G4	Greer Steel Co., Dover, O.
G5	Green River Steel Corp., Owenboro, Ky.
H1	Hanna Furnace Corp., Detroit
I2	Ingersoll Steel Div., New Castle, Ind.
I3	Inland Steel Co., Chicago, Ill.
I4	Interlake Iron Corp., Cleveland
J1	Jackson Iron & Steel Co., Jackson, O.
J2	Jessop Steel Corp., Washington, Pa.
J3	Jones & Laughlin Steel Corp., Pittsburgh
J4	Joslyn Mfg. & Supply Co., Chicago
J5	Judson Steel Corp., Emeryville, Calif.
K1	Kaiser Steel Corp., Fontana, Calif.
K2	Keystone Steel & Wire Co., Peoria
K4	Keystone Drawn Steel Co., Spring City, Pa.
L1	Laclede Steel Co., St. Louis
L2	La Salle Steel Co., Chicago
L3	Lone Star Steel Co., Dallas
L4	Lukens Steel Co., Coatesville, Pa.
M1	Mahoning Valley Steel Co., Niles, O.
M2	McLouth Steel Corp., Detroit
M3	Mercer Tube & Mfg. Co., Sharon, Pa.
M4	Mid States Steel & Wire Co., Crawfordsville, Ind.
M7	Milton Steel Products Div., Milton, Pa.
M8	Mill Strip Products Co., Evanston, Ill.
M9	Moltrup Steel Products Co., Beaver Falls, Pa.
M10	Mill Strip Products Co., of Pa., New Castle, Pa.
N1	National Supply Co., Pittsburgh
N2	National Tube Div., Pittsburgh
N4	Northwestern Steel & Wire Co., Sterling, Ill.
N6	Northwest Steel Rolling Mills, Seattle
N7	Newman Crosby Steel Co., Pawtucket, R. I.
N8	Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9	Nelson Steel & Wire Co.
O1	Oliver Iron & Steel Co., Pittsburgh
O2	Oregon Steel Mills, Portland
P1	Page Steel & Wire Div., Monessen, Pa.
P2	Phoenix Steel Corp., Phoenixville, Pa.
P3	Pilgrim Drawn Steel Div., Plymouth, Mich.
P4	Pittsburgh Coke & Chemical Co., Pittsburgh
P6	Pittsburgh Steel Co., Pittsburgh
P7	Portsmouth Div., Detroit Steel Corp., Detroit
P8	Plymouth Steel Co., Detroit
P9	Pacific States Steel Co., Niles, Cal.
P10	Precision Drawn Steel Co., Camden, N. J.
P11	Production Steel Strip Corp., Detroit
P13	Phoenix Mfg. Co., Joliet, Ill.
P14	Pacific Tube Co.
P15	Philadelphia Steel and Wire Corp.
R1	Reeves Steel & Mfg. Div., Dover, O.
R2	Reliance Div., Eaton Mfg. Co., Massillon, O.
R3	Republic Steel Corp., Cleveland
R4	Roebling Sons Co., John A., Trenton, N. J.
R5	Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6	Rodney Metals, Inc., New Bedford, Mass.
R7	Rome Strip Steel Co., Rome, N. Y.
S1	Sharon Steel Corp., Sharon Pa.
S2	Sheffield Steel Div., Kansas City
S3	Shenango Furnace Co., Pittsburgh
S4	Simonds Saw and Steel Co., Fitchburg, Mass.
S5	Sweet's Steel Co., Williamsport, Pa.
S7	Stanley Works, New Britain, Conn.
S8	Superior Drawn Steel Co., Monaca, Pa.
S9	Superior Steel Div. of Copperweld Steel Co..
S10	Seneca Steel Service, Buffalo
S11	Southern Electric Steel Co., Birmingham
S12	Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13	Seymour Mfg. Co., Seymour, Conn.
S14	Screw and Bolt Corp. of America, Pittsburgh, Pa.
T1	Tonawanda Iron Div., N. Tonawanda, N. Y.
T2	Tennessee Coal & Iron Div., Fairfield
T3	Tennessee Products & Chem. Corp., Nashville
T4	Thomas Strip Div., Warren, O.
T5	Timken Steel & Tube Div., Canton, O.
T7	Texas Steel Co., Fort Worth
T8	Thompson Wire Co., Boston
U1	United States Steel Corp., Pittsburgh
U2	Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3	Ulbrich Stainless Steels, Wallingford, Conn.
U4	U. S. Pipe & Foundry Co., Birmingham
W1	Wallingford Steel Co., Wallingford, Conn.
W2	Washington Steel Corp., Washington, Pa.
W3	Weirton Steel Co., Weirton, W. Va.
W4	Wheatland Tube Co., Wheatland, Pa.
W5	Wheeling Steel Corp., Wheeling, W. Va.
W6	Wickwire Spencer Steel Div., Buffalo
W7	Wilson Steel & Wire Co., Chicago.
W8	Wisconsin Steel Div., S. Chicago, Ill.
W9	Woodward Iron Co., Woodward, Ala.
W10	Wyckoff Steel Co., Pittsburgh
W12	Wallace Barnes Steel Div., Bristol, Conn.
Y1	Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities		Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	City Delivery‡ Charge	Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta	....	9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	......	......	......	......
Baltimore**	$.10	8.37	9.71	10.16	10.78	8.94	9.63	9.15	11.90	17.48	16.48	21.58	20.83
Birmingham**	......	8.46	10.20	10.69	9.45	8.41	8.47	8.26	13.14	16.76	.....	.....	......
Boston**	.10	9.77	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.80	9.95	11.40	11.15	8.80	9.30	8.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.72	10.35	10.30	10.89	8.56	9.06	8.70	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	8.89	10.41	10.35	11.21	8.94	9.62	9.02	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.72[1]	10.13	11.39	11.01	8.80	9.45	8.81	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	......	......	.....	20.84
Detroit**	.15	8.98	10.61	10.65	11.26	8.93	9.62	9.01	11.16	17.38	16.38	21.48	20.73
Houston**	....	9.22	10.03	12.19[3]	10.78	8.95	8.86	8.63	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**	....	9.59[1]	11.29	12.20	11.29	9.82	10.54	9.67	14.20	18.30	17.35	22.90	22.20
Memphis**	.15	9.99	10.20	......	11.39	10.27	10.48	10.07	12.89	......	......	......	......
Milwaukee**	.15	8.86	10.49	10.44	11.03	8.70	9.28	8.84	11.04	17.24	16.24	21.24	20.49
New York	.10	9.46	10.23	11.45	11.56	9.61	10.30	9.84	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	......	....	8.90	8.65	9.20	8.90	10.70	......	......	.....	......
Philadelphia**	.10	10.45	10.10	11.50	10.95	8.80	9.05	8.85	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	8.72	10.13	11.28	10.99	8.56	9.06	8.70	11.40	17.10	16.10	19.70	20.45
Portland**	....	10.20	12.05	12.35	12.20	10.35	10.80	10.20	16.65	18.50	17.45	20.75	20.25
San Francisco**	.10	10.27	11.79[2]	11.55	11.88	10.48	10.59	10.17	15.20	18.30	17.35	22.90	22.20
Seattle**	....	10.51	11.57	12.50	11.95	10.10	10.65	9.94	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	10.51	11.57	12.50	11.95	10.10	10.65	9.94	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.92	10.75	10.68	11.09	8.77	9.29	8.92	11.43	17.48	16.48	21.58	20.83
St. Paul**	.15	8.99	9.74	10.99	11.16	8.83	9.33	8.97	11.64	....	16.69	....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—¾-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective Oct. 3, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	....	....
Birmingham *W9*	62.00	62.50*	66.50	....	....
Birmingham *U4*	62.00	62.50*	66.50	....	....
Buffalo *R3*	66.00	66.50	67.00	67.50	....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	....
Chester *P2*	68.00	68.50	69.00	....	....
Chicago *I4*	66.00	66.50	66.50	67.00	....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	....	....	....
Geneva, Utah *C7*	66.00	66.50	....	....	....
Granite City *G2*	67.90	68.40	68.90	....	....
Hubbard *Y1*	....	....	66.50	....	....
Ironton, Utah *C7*	66.00	66.50	....	....	....
Lyles, Tenn. *T3*	....	....	....	....	73.00
Midland *C11*	66.00	....	....	....	....
Minnequa *C6*	68.00	68.50	69.00	....	....
Monessen *P6*	66.00	....	....	....	....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	....	66.50	67.00	67.50	....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	....	66.50	67.00	....
So. Chicago *R3*	66.00	66.50	66.50	67.00	....
So. Chicago *W8*	66.00	....	66.50	67.00	....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66-00	66.50	66.50	67.00	....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	....	....	66.50	....	....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel.

Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)	*Pct*
Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)	*Pct*
Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)	
Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Add 7½ pct for nuts assembled to bolts)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Discount Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	--	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	43.75	71.75	54.75	64.75	30.00	30.00	31.25 31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* wensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa , *C2.*

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

		Discount Hex	Discount Square
Full Cartons		46	57
Bulk			
¼ in. diam or smaller	25,000 pcs	56	60
5/16 or ⅜ in. diam	15,000 pcs	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium..					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Oct. 3, 1960)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	...	...	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	...	...	.....	9.00	9.55
Cleveland *A6*	.....	.....	...	...	.....	.....	......
Cleveland *A5*	.....	.....	...	...	.....	9.00	......
Crawf'dsv. *M4***	175	193	...	214	199	9.10	9.85
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	...	...	.....	.....	......
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	...	...	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	.....	.....	...	...	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.95	10.50
Rankin Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	...	236	.....	9.95	10.50
Sparrows Pt. *B3***	175	.....	...	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	...	...	.....	8.65	9.20
Worcester *A5*	179	.....	...	...	.....	9.30	9.85
Williamsport *S5*	.....	.....	...	...	.....	.....	......

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	......	......	......	......	......	......	......	......
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	......	......	......	......	......	......	......	......
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50	......	......	......	......	......	......	......	......
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	......	......	......	......	......	......	......	......
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	......	......	......	......	......	......	......	......
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	......	......	......	......	......	......	......	......
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	......	......	......	......	......	......	......	......
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	......	......	......	......	......	......	......	......
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50	......	......	......	......	......	......	......	......
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	......	......	......	......	......	......	......	......
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	......	......	......	......	......	......	......	......
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	......	......	......	......	......	......	......	......
Fontana *K1*	*6.25	......	*2.25	......	0.75	......	1.25	......	1.75	......	2.25	......	2.75	......	......	......	......	......	......	......	......	......
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	......	......	......	......	......	......	......	......
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	......	......	......	......	......	......	......	......
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	......	......	......	......	......	......	......	......
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	......	......	......	......	......	......	......	......
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50	......	......	......	......	......	......	......	......
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

	Net-Ton
Furnace, beehive (f.o.b.)	
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

stack-molding
gives you lower-cost castings

This 2¼-pound gray iron casting is a generator part for an automotive electrical system.

COSTS were CUT by casting 60 at a time . . . 5 to a mold . . . 12 molds high.

If you have high-volume requirements for fairly flat parts . . . investigate STACK-MOLDING.

to fill your IMMEDIATE NEEDS for QUALITY PRECISION CASTINGS at LOWER COST

Contact . . .

RELIABILITY . . . Uniformly high quality, with dependable composition and structure.

ACCURACY . . . Maintenance of close tolerances reduces production costs.

HIGH STRENGTH . . . Heat-treating facilities available to provide any desired properties.

OVERNIGHT DELIVERY WITHIN 500 MILES

GREAT LAKES FOUNDERS & MACHINE CORP.
LUDINGTON, MICH.

Specialists in Stack-, CO_2, and Shell-Mold Casting

DYKEM
STEEL BLUE
Stops Losses
making Dies and Templates

DYKEM STEEL BLUE
SPECIMEN
With DYKEM Steel Blue
Without DYKEM Steel Blue

Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead

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DYKEM HI-SPOT BLUE NO 107

CUT SCRAPER TIME
END NIGHT CLEANUP & MORNING REBLUING

DYKEM HI-SPOT BLUE No. 107 is used to locate high spots when scraping bearing surfaces. As it does not dry, it remains in condition on work indefinitely, saving scraper's time. Intensely blue, smooth paste spreads thin, transfers clearly. No grit; noninjurious to metal. Uniform. Available in collapsible tubes of three sizes. Order from your supplier. Write for free sample tube on company letterhead.

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GOSS and DE LEEUW
MULTIPLE SPINDLE
CHUCKING MACHINES
Tool Rotating
GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT				
	0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	15.60	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Castle, Pa. *M10*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Warren, Ohio *T4*	8.95	10.40	12.60	15.50	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	48.00
Electrodeposited, 5000 lb lots	39.50
Brass, 80-20, ball anodes, 2000 lb or more	53.00
Zinc, ball anodes, 2000 lb lots	20.50
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carbon, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium, 5000 lb	1.40

Tin, ball anodes $1.05 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 25.2 Cu min, 6000 to 12,000 lbs per cwt	$13.75
Nickel sulfate, 5000 to 23,000 lbs	29.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. Chicago, 200 lb drums	25.00
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots or over, except as noted)

Iron Powders		
Molding grade, domestic and foreign, 98 pct Fe, 100 mesh bags, freight allowed east of Miss. R.		11.50
Electrolytic Iron, melting stock, 99.87 pct Fe, truckload lots		25.75
Carbonyl Iron (200 lb lots)		88.00
Welding Grades		8.10
Cutting and Scarfing Grades		9.85
Hydrogen reduced, domestic		11.25
Copper Powders		
Molding Grades		
Electrolytic, domestic, f.o.b. shipping point.		15.00†
Atomized	46.5 to	64.5
Reduced		15.00†
Chemically Precipitated		15.00†
Brass, 5000-lb lots	35.1 to	52.2
Bronze, 5000-lb lots	53.1 to	56.7
Chromium, electrolytic		5.00
Lead		7.50†
Manganese, electrolytic		$1.00
Molybdenum	$3.60 to	$4.35
Nickel		$1.15
Carbonyl Nickel, 20,000 lb lots		$1.01
Nickel-Silver, 5000 lb lots	60.7 to	69.0
Silicon		70.00
Solder		7.00†
Stainless Steel, 316		$1.07
Stainless steel 304		89.00
Tin		14.00†
Titanium, 99.25 + pct, per lb, f.o.b.		$11.25
Tungsten, carbide grades		$3.25

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† Plus cost of metal.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length)	
		Semi-Processed	Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*)			Sheet (*I2*)
		10 pct	15 pct	20 pct	20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 44.20; 1 side, 36.80.

(Effective Oct. 3, 1960)

REFRACTORIES

Fire Clay Brick

	Carloads per 1000
Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty	
Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

	Per net ton
Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

F.o.b. bulk, producing points in:	*Per net ton*
Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100, 110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size		Seamless		Elec. Weld
	OD-In.	B.W. Ga.	H.R.	C.D.	H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel	2	13	40.28	47.21	....
	2½	12	54.23	63.57	....
	3	12	62.62	73.40	....
	3½	11	73.11	85.70	....
	4	10	97.08	113.80	....

GUARANTEED—RE-NU-BILT

Electric Power Equipment — A. C. Motors

3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1750	G.E.	M-579BS	4800	1800
1	800	Whse	CW	500	1776
1	800	G.E.	MT-428	2200	450
1	600	Whse.	CW	220/440	900
1	600	Whse.	CW-4-32D-15	440	1778
1	550	Whse.	CW	440	252
1	500	Whse.	CW	550	350
1	300	A.C.	ANY	440/2300	720
1	300	G.E.	MTP561	2200	1800
1	250	G.E.	IM-16	220/440	875
1	250	A.C.	ANY	550	600
1	250	Cr.Wh.	Size 20Q	2300	350
1	250	G.E.	MT-424Y	4000	257
1	200	G.E.	IE-18B	220	1800
2	200	Whse.	CW-890	2300	1775
1	200	G.E.	IM	440	435
1	150	G.E.	IM-17	440	435
1	200	G.E.	IM	2200	580
1	125	G.E.	MT-557	220/440	1200
3	100	A.C.		440	695
1	100	G.E.	M-6888Z	220/440	580

SQUIRREL CAGE

Qu.	H.P.	Make	Type	Volts	Speed
1	500	G.E.	FT-559AY	2300	3600
2	500	Whse.	CSP-563H	440	3600
1	500	Whse.	CS-1115	2300	863/445
4	500	Whse.	CS-1216	2200	600
3	450	Ell.	F-8910	2200	1200
1	400	Whse.	CS-7151 610H	6600/4000	3585
1	300	Whse.	CS-1092	2300/440	600
1	250	Whse.	CS-8758	2200	1775
1	200	Whse.	CSP-5818	440	3450
2	200	Whse.	CS-8558 D.P.	220/440	1750
	200/150	Whse.	CS-963H	2300	1175/878
1	150	G.E.	FT-556	2200	875
1	150	Whse.	CS	440	580
1	125	Whse.	CS-764C	220/440	1160
3	100	Whse.	CS-760C	2200/440	1160
1	100	Whse.	B.B.CS-607-	220/440	1730

SYNCHRONOUS

Qu.	H.P.	Make	Type	Volts	Speed
1	6000	G.E.	ATI.8	200/6600	600
1	3500	G.E.	TS 1.0	4600/2300/4000	360
2	1750	G.E.	ATI	2300	3600
3	500	G.E.	TS-9560.8P.F.	2200	1200
1	400	G.E.	TS-7565	2200	1200
2	350	G.E.	ATI 1.0P.F.	2300	150
1	325	G.E.	ATI 1.0P.F.	440	1800
3	200	El Mach.	BRKT	2200	1200

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Tel. OL 3-3334

REBUILT—GUARANTEED ELECTRICAL EQUIPMENT

SLIP RING MOTORS

3 Phase—60 Cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
1**	2500	Al.Ch.	ANY	2200	296
1**	1800	Whse.	Mill	2300	252
1**	1300	Whse.	CW	2200	444
1	700	Whse.	CW-1224	2200	600
1**	500	Al.Ch.	ANY	2200	505
1**	500	Al.Ch.	ANY	2200	293
1	400	Whse.	CW	2200	600
1*	400	Al.Ch.	ANY	2200	505
1	400	Whse.	CW	2200	290
1	350	G.E.	IE15-M	2200	1180
3	300	G.E.	IE15B-M	440	1200
1	300	Whse.	CW-1012	2200/440	720
1	250	Whse.	CW	4160/2400	710
1	250	Whse.	CW	2200	600
1	250	Cr.Wh.	Size Q	4600/2300	350
1	250	G.E.	MT-414	2200	300
2	200	G.E.	I-17-M	2200/440	600
1	200	G.E.	I-14-M	2200	490
1	150	G.E.	MT-564	2200/440	700
1	150	Whse.	CW	4160/2200	585
1	150	Whse.	CW-954	440	514
1	150	Whse.	CW-1000	440	435

*—Pedestal Bearings
**—Mill type with stator shifting base

SYNCHRONOUS MOTORS

3 Phase—60 Cycle

Qu.	H.P.	Make	P.F.	Volts	R.P.M.
1	4200	G.E.	.90	13200/6600/ 4160	300
1	4500	Whse.	.80	4700	1200
2	1750	G.E.	1.00	2200	3600
2	1750	Whse.	1.00	4100	450
1	1500	Whse.	.80	2300	514
2	1450	Whse.	.80	4100	450
1	920	G.E.	1.00	440	300
1	700	El.Mchy.	1.00	440	220
1	650	G.E.	.80	2300/4000	1200
1	500	El.Mchy.	.80	2300/4000	720

FREQUENCY CONVERTING SETS

1—3000-KVA G.E. 300 R.P.M., 2300-Volt, 3 phase, 25 cycle with Syn. Motor, 3600-HP, .90 P.F., 13200/6600/4160-Volt, 3 phase, 60 cycle, with exciter and complete starting equipment.
1—460-KVA G.E. 300 R.P.M., 440-Volt, 3 phase, 25 cycle and Syn. Motor 500-KVA, .80 P.F. 440-Volt, 3 phase, 60 cycle, exciter and Starting Equipment.

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THE CLEARING HOUSE

Midwest Dealers Look to October

Used machinery dealers had hopes that the Machine Tool Exposition would result in used tool sales.

But September was a "bad" month. Now the dealers say October will bring the upswing.

■ Despite many used tool buyers at the recent Machine Tool Exposition, the Midwest shows no big gains in used machine sales.

Dealers had been hopeful of a recovery in September after the low sales levels of July and August. Recent figures released by Machinery Dealers National Assn. show dollar sales in August down 3.1 pct from August, 1959.

A Chicago used tool dealer told The IRON AGE, "October has to be better. They just can't get along much longer without making some new purchases. They sure didn't make them this month."

He adds that September was the worst month of the year for him. However, this is not necessarily the general opinion.

Slight Gains—With very careful study, it's possible to detect a slightly better sales climate for the Midwest. There were some gains in rebuilt machine tool activity. One company reports it has been able to keep a 20 man crew working. And the presence of buyers in Chicago for the exposition did prompt sales.

But all of this still didn't shape up to a normal September sales gain. One tool seller comments, "If a visitor comes to my shop, he's a buyer. We're not getting inquiries, but anyone who take the time to visit us, does it because he needs a tool."

A competitor notes, "Sure the guy might be a buyer. But he'll offer you half of what the tool is worth." Most Midwest dealers agree that buyers are tight with cash and making counter-offers at sharply reduced prices.

Winds Without Direction—One dealer reports he's reduced his stock to minimum levels at a period when he usually builds inventory. He says he prefers to have the cash until he is sure about business winds.

One factor that may be confusing the tool sales picture is hefty price cutting in the Midwest. Another dealer admits his unit sales are "pretty good." But he says his prices are down to the point where he can't hold up his dollar volume.

The key to October activity may be in rebuilder sales. Already some rebuilders have experienced activity increases and many others have been getting inquiries at an accelerated pace. In fact, this is the first time in months that customers have been willing to discuss potential work very far in advance.

Sheet Metal Tools Too—Among the areas where sales are down is sheet metal fabricating equipment. Even though this is normally a fair seller in the Midwest, buyers are seeking sharp price cuts.

Where sales have been recorded in recent weeks, no particular items have been favored. Lathes, millers, radial drills, grinders, and heavy special equipment are moving at about the same pace. This indicates that small job shops are gripping capital dollars just as tight as the larger manufacturer.

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BENDING ROLLS
13′ x 3/16″ Bertsch Initial Type—NEW 1957
12′ x 1½″ Bertsch Initial Type—NEW 1956
BOLT MACHINE
⅝″ National Bolt Making Machine
BRAKES—PRESS TYPE
16′ x 5/32″ Dreis & Krump Model 516-D
18′ x ⅜″ Cincinnati
30′ x ⅝″ Birdsboro Hydraulic
BRAKE—LEAF TYPE
12′ x ¼″ Dreis & Krump "Chicago" No. 226
CUT-TO-LENGTH LINE
60″ x 12″ Ga. McKay
DRAW BENCH
10,000# Double Draw, 65 ft. Draw
FURNACES—MELTING
3AJAX Electrothermic Induction Melting, 6000#, 3000# and 650#
Swindell Top Charge, Tilt Type, 12 ft. Shell Complete with transformer equipment
HAMMERS
2000 lb. Chambersburg Steam Drop
8000 lb. Chambersburg Steam Forging
HEADER
#55 Waterbury Farrel DSOD, Capacity up to ¾″ Diameter
LEVELERS
96″ Hilles & Jones, 4 Rolls 12″ Diameter
72″ Hilles & Jones, 6 Rolls 7″ Diameter
MULTI-SLIDE
#35 U. S. Multi-Slide, Max Width of Stock 4¼″ x .069 thick, Length Feed 12½″
PAINT SYSTEM
Electro-Static Paint System. Complete equipment including conveyor
PLANER—PLATE EDGE
30′ Southwark Model B-19
PRESSES—HYDRAULIC
75 ton W&W Straightening Press, 14″ Stroke, Area of Table 124″ x 60″
275 ton United Horiz. Drawing Press, 15′ 6″ Stroke, 48″ Bet. Columns
450 ton Southwark Gap Type Joggling Press
750 ton Extrusion Press
4500 ton B-L-H Hydr. Press, 40″ Stroke, 68½ x 68½ Between Columns
ROLLING MILLS
Complete Copper Hot Rolling Mill, Starting size copper bar 4x4x46″, Finish size 5/16″
17″ x 26″ Waterbury Farrel Single Stand 2-Hi
40″x26½″x112″ Lewis 3-High Plate Mill
PUNCH & SHEAR COMBINATION
#2½ Buffalo Ironworker, Punch 1 x ⅞″ Shear Rd. 2¼, Sq. 2″, Angle 6 x 6 x ½″
SHEAR—ALLIGATOR
#3½ Lewis All Steel, Capy. 4″ Rd. 3¾″ Sq.
SHEAR—GATE
8′ x 1″ Cincinnati, 24″ Gap
SHEARS—SQUARING
8′ x ¼″ Cincinnati
12′ x ¼″ Cincinnati, 18″ Gap
SHEARS—MISCELLANEOUS
36″ Hallden Drum Type Shear Line, Designed for 33/38 Ga. Widths 16″ to 38″
84″ x 3/16″ United Cut-U Shear
DT-36-B Pels Beam Shear, Capy. 3″ to 15″ beams & channels, 6 x 6 x ⅝″ angles
SLITTERS
48″ Yoder Slitting Line, Arbor 6″ Dia.
60″ Yoder Sheet Slitter
STRAIGHTENERS
#000 Blaw-Knox Medart 2-Roll Rotary
⅝″ Lewis #10F, With 16 ft. Cut Off
3/16″ Lewis #3F, With 12 ft. Cut Off
TUBE MILLS
HL-4 Yoder, Capacity ⅜″ x .025″ to 4″ x .134″
Trent Tube Mill, Capy. 3″ to 8″ Dia. 10 Ga.
WELDER
Peer Model #P-100-12 Aluminum Welder Air Operated, Press Type, 100 KVA 220/3/60
WIRE EQUIPMENT
Vaughn 4/5 HIV Motoblox, Start .162″ low carbon steel Finish .076″
#4P Fenn Standard Turks Head, 30 H.P. Motor
Syncro Model HS1-A High Speed 7 Bay Tubular Strander

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183 CFM 150 psi 7 x 7 Joy WG9.
191 CFM 300 psi 9-4¼ x 9 ES-2.
194 CFM 125 psi 7-7-6 x 5 Worth. M40.
234 CFM 100 psi 9 x 9 Ing.—Worth. Chis. Penn.
290 CFM 75 psi 10 x 9 Ing. ES-1.
384 CFM 100 psi 10 x 9 Joy WG9.
465 CFM 100 psi 12 x 11 IR—Amer.
502 CFM 125 psi 12 x 13 Ing. Rand, Worth
585 CFM 100 psi 15-9¼ x 12 Ing.
600 CFM 125 psi 11½ x 7 x 7 Joy WN 102.
678 CFM 100 psi 15-9¼ x 12 Ing. XRB.
866 CFM 100 psi 14 x 13 IR—CPT.
877 CFM 125 psi 17/10½ x 14—IR—XRB.
1055 CFM 110 psi 18-11 x 12 CP. OCE.
175 hp G.E. Syn 3-60-208 volts, starter—MG set—Aftercooler Receiver.
1670 CFM 100 psi C300-300H Fuller Rotary.
300 hp West. Syn. 3-60-440, 80% PF.
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No. 5 Bryant, m.d., latest
No. 5Y Bryant, m.d., latest
No. 16-16″ Bryant, m.d., hydraulic hole grinder
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No. 16-22″ Bryant, m.d., latest
No. 16-38″ Bryant, m.d., latest
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No. 24-36″ Bryant Hole & Face Type, m.d., late
No. 24-P-26″ Bryant, m.d.
No. 24-21″ Bryant, m.d.
No. 24-L-36″ Bryant, m.d., late
No. 24-LW-36″ Bryant, m.d., late
No. 649-16″ Van Norman Automatic Oscillating Radius, m.d., latest
No. 70A Heald, m.d., latest, 1945
No. 72A3 Heald Full Universal, m.d.
No. 72A3 Heald Gagematic, m.d.
No. 72A3 Heald Plain, m.d.
No. 72A3 Heald Plain Sizematic, m.d.
No. 72A5 Heald Plain, m.d.
No. 73 Heald Airplane, m.d., latest, new
No. 74 Heald Long Base, 1945
No. 74 Heald, Plain Long Base, m.d., 1943
No. 74 Heald, m.d.
No. 75A Heald, m.d., latest
No. 81 Heald Gagematic, Sizematic, m.d.
No. 81 Heald Plain & Sizematic, m.d.
No. 81 Heald sizematic, m.d., 1944, cheap
No. 104 Rivett, m.d.
No. 172 Heald Plain Adjustable Gap Hydraulic, m.d.
No. 112YE Bryant, m.d.

PLAIN CYLINDRICAL GRINDERS
No. 5 Brown & Sharpe, Plain, m.d., 1942
No. 20—10x18″ cap. Brown & Sharpe Plain, m.d.
6x15″ Cincinnati Plain Hydraulic, m.d.
6x18″ Landis Type C Hydraulic, m.d., late
6x18″ Norton Plain Grinder, m.d.
10x18″ Cincinnati Plain Hydraulic, Model ER, m.d., Filmatic Spindle, 1943
10x18″ Norton Type C, m.d., latest

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1, BALDWIN, 120-Ton, 1000 H.P., Std. Ga.

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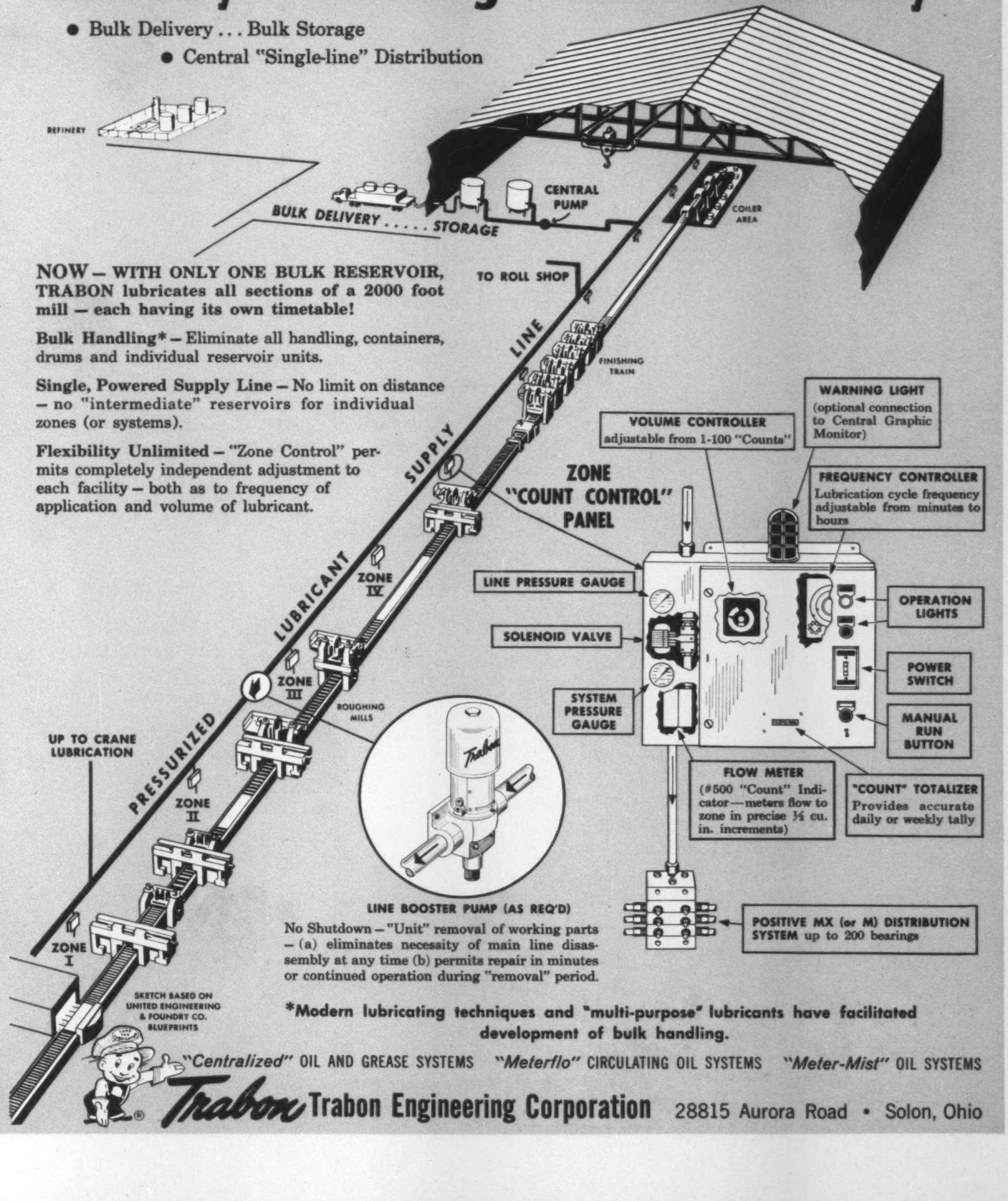
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Flexibility Unlimited — "Zone Control" permits completely independent adjustment to each facility — both as to frequency of application and volume of lubricant.

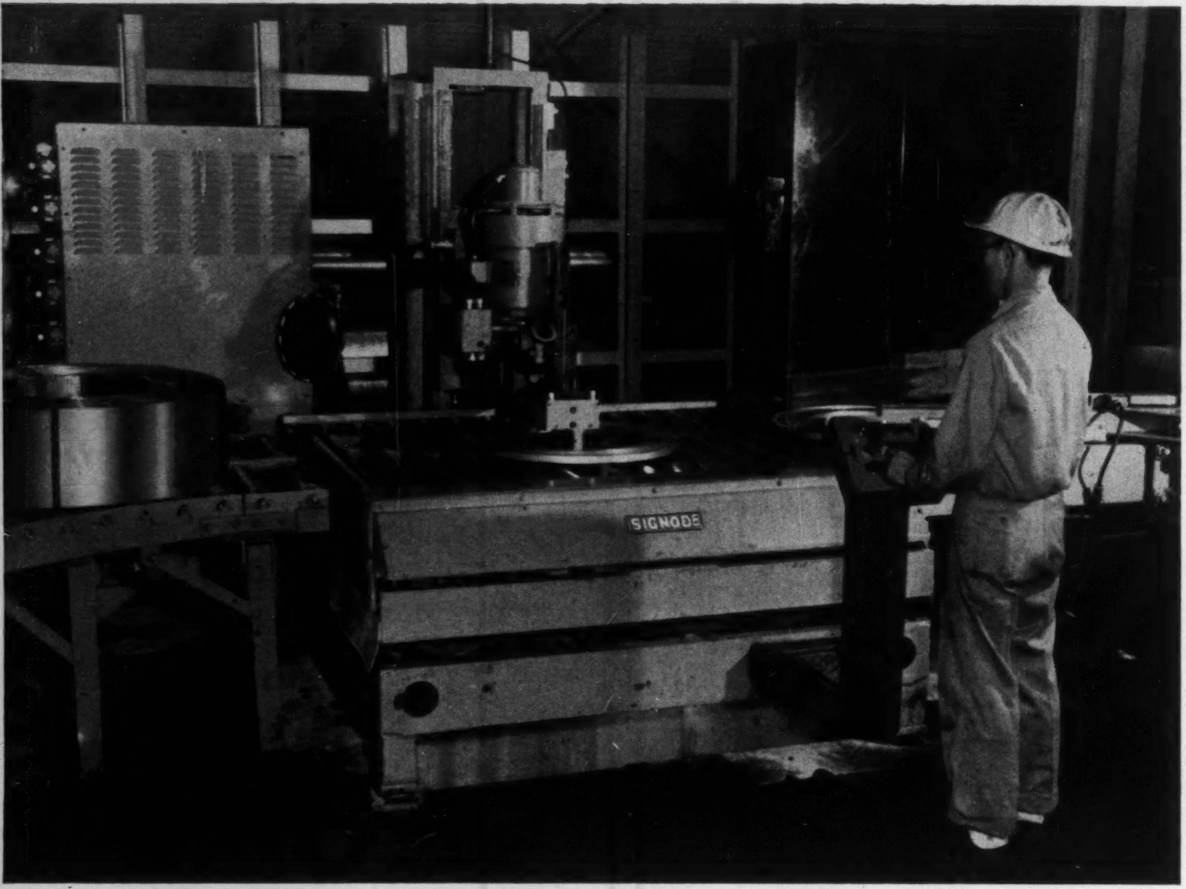
LINE BOOSTER PUMP (AS REQ'D)

No Shutdown — "Unit" removal of working parts — (a) eliminates necessity of main line disassembly at any time (b) permits repair in minutes or continued operation during "removal" period.

***Modern lubricating techniques and "multi-purpose" lubricants have facilitated development of bulk handling.**

"Centralized" OIL AND GREASE SYSTEMS *"Meterflo"* CIRCULATING OIL SYSTEMS *"Meter-Mist"* OIL SYSTEMS

Trabon **Trabon Engineering Corporation** 28815 Aurora Road • Solon, Ohio



Fast new Signode M20 strip coil strapping machine

Push a button, and this Signode M20 feeds the strapping through the eye of the coil and tensions, seals, and severs it—all in a few seconds. Push another button, and the machine rotates the coil for the next strap. The operator can apply two, three, four or more straps per coil.

Mixed coil sizes are strapped at volume production speeds. The machine automatically adjusts for any coil height (width of strip) between ½ inch and 14 inches, and for any coil O.D. from 19 inches to 50 inches. Each strap is applied with the same pre-set tension. As on all M20's, tension is easy to adjust if desired.

The machine puts the seal on the upper face of the coil. There are several advantages to this: working parts last longer because they are subject to minimum dirt and grit, accessibility for servicing is excellent, the seal is in plain sight.

A wide range of M20's is available on a deposit or annual rental basis, for strapping products of almost any shape and size up to six feet in diameter, using strapping from ⅜ to ¾ inches wide.

Write for details, including free booklet, "Signode M20 Series Standard Power Strapping Machines."

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